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ABSTRACT

This report examines the sub-baccalaureate labor market, defined as a labor market for those with less than a baccalaureate degree but at least a high school diploma. This market constitutes about three-fifths of employment. Following an introduction, the report describes the sub-baccalaureate labor market as primarily a local labor market dominated by small employers and affected by cyclical variation that undermines incentives to accumulate extensive training and experience. Next, the report looks at providers of education in the sub-baccalaureate market and their connections to employers. Among other things, advisory committees, placement offices, contract education, co-op programs, and licensing requirements are discussed. Then the report examines employers, concentrating on the following areas: (1) skills employers want; (2) hiring standards; (3) views about education providers; (4) promotion practices; and (5) employment trends. The report concludes that the sub-baccalaureate labor market generally works better for employers than for employees. The report identifies the following areas in need of reform: (1) the teaching of basic academic skills; (2) dissemination of information about the employment effects of various education and training programs; (3) the connections between educational institutions and employers; and (4) use of skill standards to organize sub-baccalaureate labor markets. Two appendices describe labor markets and describe interview methods and protocols. There are 67 references. (CML)

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This research originated in a series of community case studies of education and training programs conducted by Norton Grubb and Lorraine McDonnell, assisted by John Lederer and Liz Alpert. Norena Badway and Clair Brown made helpful comments on early drafts, and Erica Grubb provided invaluable advice on legal issues.

EXECUTIVE SUMMARY

The sub-baccalaureate labor market—the labor market for those with less than a baccalaureate degree but at least a high school diploma—constitutes about three-fifths of employment. It has been growing steadily in the past two decades, and the relative earnings of those with "some college" have also been increasing, suggesting increasing demand. This is also the labor market for which high schools as well as community colleges and technical institutes (the fastest-growing segments of postsecondary education) prepare their occupational students.

Despite the importance of the sub-baccalaureate labor market, we know relatively little about the way it works. A relatively small body of statistical analysis indicates that the economic returns to community colleges and technical institutes are quite varied and that the many individuals who begin postsecondary education but fail to complete credentials are unlikely to benefit much. However, the process by which individuals with sub-baccalaureate education make their way into the labor force has not been carefully examined.

To add to our information, this report presents the results of interviews with employers and education providers in four local labor markets. The four labor markets were chosen to provide some variety: one, which we call Frankton, has concentrated on agriculture and agricultural processing; a second (Palmdale) has emphasized high-tech development and manufacturing; a third (Rosefield) has a highly diversified economy with considerable government and service employment as well as some high-tech manufacturing; and a fourth (Cotooli) is a center for the manufacture of machinery and machine tools. To enable our interviews to be more precise, we concentrated on six occupations/occupational areas typical of those in sub-baccalaureate labor markets and widely represented within high school and postsecondary vocational programs: electronics technician, machinist, drafter, accountant, business occupations, and computer-related occupations.

The Characteristics of Sub-Baccalaureate Labor Markets

Occupations in the sub-baccalaureate labor market have been affected by several organizational and technological trends: the shift to firms with flatter hierarchies with greater responsibilities for individual workers; the ubiquity of computer applications; and the slow and uneven pace of technological innovation, which often requires workers to be capable in various production processes. Educational institutions have responded with increases in computer-related courses and with total quality management (TQM) as a reflection of the expanded responsibilities production-level employees now have. These changes also mean that the conventional occupational divisions are blurring and that certain capacities—communication skills, initiative and motivation, and problem-solving abilities—are increasingly important.

The sub-baccalaureate labor market is plagued with cyclical variation. Employment opportunities vary substantially over the business cycle, and the intermittent employment undermines incentives to accumulate extensive training and experience. Enrollments in community colleges and technical institutes also expand substantially during downturns, increasing the numbers of students just at a time when there is little demand for graduates.

A third characteristic of the sub-baccalaureate labor market is that it is almost entirely local. Firms search for their employees locally and informally, and individuals search for work locally; community colleges, technical institutes, and area vocational schools orient their programs almost entirely to local employers. The only exceptions arise in cases of severe local labor shortages or when an employer has established a close relationship with a particular nonlocal educational provider. The local nature of these markets may make adjustments to changing labor demand slower and less certain.

Entry into the sub-baccalaureate labor market seems to be dominated by small firms; those in search of better positions move to larger firms or perhaps to more sophisticated middle-sized firms. The providers of education and training are also small in the sense that at a particular time there are relatively few completers in any one occupational area. The fact that both demand and supply are dominated by small institutions may thwart the development of the information necessary for markets to operate efficiently.

Not surprisingly, there are notable differences among local labor markets. Frankton, with its origins in agriculture and processing, is technically much less sophisticated than Palmdale and Cotooli, for example. The dominance of high-tech development and manufacture in Palmdale has affected its economy much more than the diversified economy of Rosefield. The high costs in Palmdale and the relative isolation of Frankton have caused somewhat idiosyncratic problems in attracting well-trained workers. However, the commonalities across different communities in the characteristics of sub-baccalaureate labor markets are more striking and allow us to generalize based on these four case studies.

The Providers of Education and Their Connections to Employers

The community colleges, technical institutes, and area vocational schools that prepare individuals for sub-baccalaureate labor markets are themselves quite varied, and their students have many different purposes. Uniformly, they have established several mechanisms to connect their programs to employers, potentially providing linkages that help students into employment and ensure that educational programs have the appropriate content. In practice, however, the mechanisms vary in the way they operate:

- *Advisory committees* provide some information about labor market demand and help institutions establish new programs. However, in many cases, they meet only infrequently or are institution-wide rather than occupation-specific and thereby provide very little information.

- *Placement offices* are understaffed in most institutions and usually concentrate on part-time, "stay-in-school" jobs rather than linking occupational programs with employment opportunities.

- *Placement by occupational instructors* does occur in some institutions, but in most cases, it is uneven and sporadic.

- *Student follow-up and tracking mechanisms*, which provide information about the subsequent employment of students, can allow instructors and institutions to analyze the strengths and weaknesses of their programs. However, these information systems are poorly developed in most postsecondary institutions, so that in practice instructors and administrators have no idea where their occupational students go.

- *Contract education*, or firm-specific customized training, is clearly booming and is another potential source of information to educational providers about the skills necessary in employment. However, most institutions establish contract education in divisions separate from regular vocational programs, limiting contract education's value in establishing links to employers.

- *Work experience and co-op programs*, combining school-based instruction with on-the-job experience, can also link employers and providers and offer students complementary approaches to learning. In three of our labor markets, these programs are rare. In Cotooli, however, well-developed co-op programs have indeed fostered close working relations between local firms and education providers; employers speak knowledgeably and positively about the educational system and without the indifference we observed in other areas.

- *Student demand* affects postsecondary providers, which are funded based on enrollment (through state aid plus tuition) and are therefore highly sensitive to enrollment changes. If students were well-informed about labor market demand, this would be a mechanism for bringing vocational offerings into line with employment opportunities. However, students are not always well-informed; educational institutions often respond to changes slowly; and the incentives against funding high-cost programs (e.g., in electronics, health, and other technical areas) mean that high employment demand may still not lead to expanded enrollments.

- *Licensing requirements,* predominantly in health occupations, specify the content of educational programs as well as hiring requirements employers must follow, establishing a congruence between employers and providers that is missing in other occupations areas. These requirements therefore establish *organized* labor markets in contrast to the *unorganized* occupations more typical of sub-baccalaureate labor markets. While there are not many other examples of licensing requirements, the skill standards now being discussed would have similar effects.

We conclude, then, that many of the mechanisms linking employers and educational providers work poorly with certain exceptions, especially the co-op programs in Cotooli and the licensing requirements in health occupations.

Skills, Hiring Standards, and Promotion Policies

Repeatedly, employers mentioned a common list of skills they look for in their middle-skilled employees: highly job-specific skills; motivation and interpersonal skills to enable them to work cooperatively; aptitude and "common sense," especially the ability to apply knowledge in complex situations; basic skills, whose deficiencies generated more complaints than any other subject; and computer-based skills. However, one inconsistency among employers became glaringly obvious: At the same time that some stress the specific skills necessary for entry-level work and bemoan the presence of extraneous theoretical and "academic" requirements in educational institutions, others emphasize broader and more "academic" capacities—those more necessary for promotion than for entry-level jobs.

Because of the importance of very specific skills and personal attributes like motivation, most employers in sub-baccalaureate labor markets rely on experience in hiring. Formal schooling may provide an edge among applicants of similar experience, but it is difficult to compensate for the lack of experience with additional schooling. As a result, sub-baccalaureate credentials are not valuable except for the skills they provide—skills which can be learned in several alternative ways. There are some exceptions: In most areas, electronics technicians require associate degrees; health workers require certain credentials to be licensed; employers in Cotooli typically hire substantial fractions of their workers through co-op programs; and some employers have established good working relations with particular community colleges. However, the dominance of experience means that the value of sub-baccalaureate education in gaining individuals access to stable employment is varied and uncertain.

Partly because of the reliance on experience rather than formal schooling, a majority of employers were not knowledgeable about local education providers and were indifferent to them. The exceptions were Cotooli, where the co-op programs have structured close working relations, and a few other cases (notably in technical fields like electronics) where employers rely on local community colleges. Short-term job training programs and proprietary schools fared even less well: From the vantage of employers, they are virtually invisible.

Once employed, promotion takes place informally and entirely because of on-the-job performance. This places a great premium on performance and on the ability to master the additional skills necessary for promotion. It also clarifies the role formal education can play in sub-baccalaureate labor markets. It can under certain conditions gain access for individuals to entry-level jobs from which they can move upward with experience and on-the-job training; however, but there is no substitute for having the wide range of capacities required in modern production.

Several trends in sub-baccalaureate labor markets are disquieting: the increasing use of temporary employment; an inflation in the requirements for "entry-level" jobs; shorter job ladders; the inflation of education requirements, with the best jobs now requiring baccalaureate degrees; and the emergence of customized training, a possible harbinger of a two-track employment system.

Conclusions and Recommendations

In several ways—particularly because of the lack of information, students' weak connections to employers, and uncertain employment benefits—sub-baccalaureate education does not work very well for its students. With some exceptions, it does not work well for employers either since employers rely on sub-baccalaureate credentials only in certain well-defined conditions and because they complain relentlessly about the sorry state of basic skills. Evidently, there is considerable room for reform and in four areas in particular:

1. There is a crying need, at both secondary and postsecondary levels, to improve the teaching of basic academic skills.
2. Information about the employment effects of various education and training programs is almost completely missing in most local areas and could be improved in many ways. This would benefit students seeking to improve their employability, administrators and instructors trying to improve their programs, and policymakers seeking more effective public programs.
3. Educational institutions can strengthen their connections to employers. This will involve scrutinizing the weakness in the various mechanisms which now exist, like advisory committees, placements efforts, and student follow-up. Co-op programs appear to be especially promising ways of linking employers and providers and of providing students with the appropriate variety of preparation.

4. Skill standards have great potential for creating organized labor markets from the unorganized relations characteristic of sub-baccalaureate labor markets and for bringing employers and education providers together in a common task.

While conventional analyses place the burden on education providers to reform, it is clear that employers are also partly to blame for the sorry state of sub-baccalaureate labor markets. Their unstable employment patterns, lack of incentives for mastering basic skills, and inattention to schools have created some existing problems. More generally, their employment policies can undermine any reforms that education providers make. Therefore, it becomes necessary to ask what responsibilities employers should bear in reconstructing the relation between education and employment. While this is a relatively novel question, there are several obvious responses:

- Employers should participate actively with both high schools and postsecondary providers, providing better information about the requirements of work to students and educators alike and cooperating in the development of co-op programs and skill standards.

- Hiring decisions and wage structures should be more responsive to educational accomplishments and skill differentials in order to provide greater incentives for prospective employees to learn those capacities which employers say are in short supply.

- Employers should preserve and enhance career ladders and reduce the cyclical variation in employment in order to provide additional incentives for the accumulation of skills and knowledge.

Even though the tradition of *laissez faire* in this country has prevented much attention to the responsibilities of employers, addressing this question is crucial. Because markets operate through the interaction of demand and supply, improving the operations of the sub-baccalaureate labor market in the interests of employers and employees alike will require the reform of both educational policies and employment practices.

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INTRODUCTION

For much of the nineteenth and twentieth centuries, education has been promoted as the solution to a variety of economic problems. In Horace Mann's efforts to institute publicly supported education in the 1830s, he described education as "not only a moral renovator and multiplier of intellectual power, but also the most prolific parent of material riches" (Mann, 1842/1971, p. 147). The movement for an explicitly vocational component to formal schooling during the period from 1890 to 1920 similarly justified education as a mechanism for "learning to earn" and a solution to problems of international competitiveness, poverty, and the integration of immigrants into the mainstream of society (Lazerson & Grubb, 1974). More recently, a barrage of commission reports—starting with *A Nation at Risk* (National Commission on Excellence in Education [NCEE], 1983), which called for education renewal as a way to restore "our unchallenged preeminence in commerce, industry, science, and technical innovation" (p. 5)—has promoted educational reform as the principal solution to declining productivity, our economic position in an increasingly competitive world, and domestic problems like poverty and inequality.

At the same time, the attention to education as a panacea—an imperfect panacea, as many have pointed out (Perkinson, 1977)—has often been hortatory, providing little evidence about why and how education should improve productivity, competitiveness, or individual well-being. Of course, the positive relationship between years of formal schooling and earnings (summarized, for example, in Leslie & Brinkman, 1988) has provided some evidence that increased schooling improves employment opportunities and by extension would improve overall productivity by moving individuals from low-wage, low-productivity employment into positions with higher productivity and wages. However, the details of this process—about the specific employment opportunities open to better-educated individuals, about the ways in which more formal education results in higher productivity—have often been missing. Part of our faith in education has been an unquestioned belief that the expansion of education or improvement in its quality will automatically lead to economic gains for both individuals and the economy.

In this report, we examine one part of the labor market in which the relationship between formal schooling and employment is poorly understood—what we call the sub-baccalaureate labor market. We define this labor market to include those who do not have baccalaureate degrees but have at least a high school diploma.[1] This group therefore includes those with a high school diploma but no further education or training plus a large, heterogeneous group with some postsecondary education, including those with certificates and associate degrees from community colleges and technical institutes, those with credentials (often simply certificates of completion) from proprietary schools, and those who have entered postsecondary institutions but have dropped out without completing any formal credentials. The group with "some college" includes individuals from those with a postsecondary course or two to those who have almost completed a B.A.

The occupations within the sub-baccalaureate labor market are neither the highly skilled positions which often (if not always) require a college or graduate degree nor are they the unskilled positions in which high school dropouts find themselves. These occupations, then—and the educational institutions like community colleges, technical institutes, area vocational schools, and proprietary schools that provide the education for these occupations—are betwixt and between, intermediate between the baccalaureate labor market with various requirements and characteristics and the unskilled labor market where education makes little difference. Of course, the extent and nature of the skills required varies substantially, and one purpose of this research is to clarify which skills are most important, where they are acquired, and what the role of formal education is in learning these skills.

Within the sub-baccalaureate labor market, we often emphasize the highly varied group with "some college" as distinct from those with a high school diploma only—and our interviews were expressly designed to examine this group. These individuals are more likely to have obtained some specialized job-specific skills through postsecondary education, while those with high school diplomas are likely to have few job-specific skills—especially as enrollments in secondary vocational programs have fallen (Clune, White, & Patterson, 1989) and the quality of these programs has become suspect. In addition, the postsecondary institutions which provide occupational education—community colleges, technical institutes, area vocational schools, and proprietary training schools—have all been expanding, yet little is known about the role they play in employment. Finally, from the perspective of individuals, the large number of high school graduates who are not bound directly for four-year colleges and the large number of "re-entry" students—those trying to switch occupations as a result of layoffs as well as women entering the workforce after raising children—usually make choices from a variety of postsecondary alternatives whose employment effects are unclear. For these individuals, then, clarifying the effects of various postsecondary alternatives would provide the information necessary to make rational decisions.

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[1] We have sometimes referred to this group as the middle-skilled labor market. We dislike the pejorative tone of the "sub-baccalaureate" phrase, especially since many individuals in community colleges are intent on completing baccalaureate degrees; but the term "middle-skilled" has very little meaning for most people. A more substantive question is whether dividing the labor market by levels of education is a useful exercise, compared to the categories of primary and secondary labor markets used in segmented labor market theories. In practice, there is substantial overlap among the ways of categorizing the labor market: Most independent primary sector positions require a baccalaureate or higher degree; most dependent secondary jobs are in the sub-baccalaureate labor market; secondary jobs are likely to be filled by people without a high school diplomas, with a few being filled by those with high school diplomas.

Of course, the boundaries of this labor market are somewhat fuzzy since some individuals with baccalaureate degrees can be found working alongside those without this credential and others with considerable amounts of college can be found in unskilled positions otherwise filled by high school dropouts. However, as we will analyze in this report, the sub-baccalaureate labor market operates in distinctly different ways from the market for individuals with baccalaureate and graduate degrees. It is also quite different from the market for unskilled employment which high school dropouts enter since the middle-skilled occupations we examined almost universally are closed to individuals without a high school diploma.

This report therefore examines sub-baccalaureate labor markets in order to add to our understanding of this underexamined segment, not by the usual statistical analysis but by a qualitative approach involving interviews with providers of education and with employers who use that education. Partly because of prior knowledge that sub-baccalaureate labor markets are intensely local (Grubb & McDonnell, 1991), we selected four areas with various characteristics—that is, four local labor markets—to study. To make the interviews with providers and employers as concrete as possible, we focused on six occupations/occupational areas: electronics technician, machinist, drafter, accountant, business occupations, and computer-related occupations. Of course, this method has its own limitations since it is impossible to be comprehensive when using a time-intensive method based on interviews; this limitation is particularly troubling in examining a segment of the labor market as varied as the sub-baccalaureate market, with substantial differences among local areas, among specific occupations, and among employers. Still, this approach provides considerable detail about the ways in which providers of education prepare their students for employment and their perceptions of employment opportunities and about the hiring and promotion practices of employers and their perceptions of education providers—and, of course, about the congruences and disjunctures between these two sides of the market. It therefore leads to a richer picture of how these labor markets operate and, in the concluding section of this report, to recommendations designed to improve the operations of sub-baccalaureate labor markets.

The Importance of the Sub-Baccalaureate Labor Market

Why should we care about the sub-baccalaureate labor market? In the first place, this has been a large and rapidly growing part of the labor force: The group with "some college" represented 13.1% of the labor force in 1967 but 20% in 1988, with an especially large rate of increase (from 5.3% to 10.5%) among women. In addition, those with a high school diploma increased from 36.3% to 39.6%. Thus, the sub-baccalaureate labor market as we have defined it includes about three-fifths of all workers. In contrast, those with baccalaureate and graduate degrees increased from 11.6% of the labor force to 22.5%—a higher rate of increase, but this group is still only one-third the size of the sub-baccalaureate group. At the other end of the education hierarchy, those with less than a high school diploma decreased in number from 39% to 16.8% of the labor force as part of the process of educational upgrading which has taken place throughout this century.

Another way to see the importance of this segment of employment is to look at trends in relative wages, which signal changing patterns of demand. Among men, those with "some college" earned one percent *less* than men with a high school diploma in 1970, indicating that employers were unwilling to pay any premium for whatever knowledge or skills these individuals had. By 1975, those with some college earned 1.7% more, a trivial difference—but one that increased to 4.4% in 1980 and to 10.9% by 1987. Among women, those with "some college" earned almost precisely the same as did high school graduates in 1970; but by 1975, they earned five percent more. As for men, this premium increased during the 1980s from 10.4% in 1980 to 12.4% in 1985 to 17.3% in 1988. Evidently, then, the demand for those with some college relative to those with a high school diploma only has increased over the past two decades.[2] Furthermore, many occupations with high proportions of individuals with "some college" are projected to continue growing at a greater than average rate, including certain health occupations; technicians and related support occupations; marketing and sales occupations; and some administrative support occupations, including computer operators (Silvestri & Lukasiewicz, 1989).

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[2] These figures are taken from Current Population Survey (CPS) data, as reported in Grubb and Wilson (1992). In their study of inequality, they find that increases in inequality during the 1980s were caused by changes related to educational shifts, including higher returns to education and increasing numbers of educated workers. While these changes were more pronounced for the group with baccalaureate and graduate degrees, they were still substantial for the group with "some college." The CPS figures corroborate results from elsewhere,

From the viewpoint of educational institutions, the sub-baccalaureate labor market is crucial. Two-year colleges—community colleges and technical institutes—have increased their enrollments substantially over the past thirty years: In 1960, thirteen percent of Fall undergraduate enrollments were in these institutions, climbing to twenty-seven percent by 1970, thirty-eight percent by 1980, and forty-four percent by 1991 (National Center for Education Statistics [NCES], 1989, 1992). While many students in these institutions plan to transfer to four-year colleges and earn B.A. degrees, in fact a small and declining number manage to do so (Grubb, 1991); a majority of students in community colleges (about 60%, according to 1990 figures[3]) and virtually all those in technical institutes describe themselves as occupational students. As a result, the majority of students in the fastest growing segment of postsecondary education are headed for the sub-baccalaureate labor market; therefore, the operations of this market are crucial to the success of these institutions. In addition, dropout rates from four-year colleges have increased (Grubb, 1989), adding yet another group to the pool entering the sub-baccalaureate labor market.

In addition, the most explicitly occupational programs within education send their students to the sub-baccalaureate labor market. The occupational students in community colleges and technical institutes, with some exceptions,[4] are preparing for employment within this segment; and vocational programs in high schools also aim for entry into this part of the labor market.[5] Thus, the effectiveness of vocational education in enhancing

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including the Survey of Income and Program Participation (SIPP) data and the National Longitudinal Study of the Class of 1972 (NLS72) data cited in Grubb (1992b), indicating that women benefit from postsecondary education more than men.

[3] These figures are taken from preliminary runs of the U.S. Department of Education's National Postsecondary Student Aid Survey (NPSAS) of 1990 data set which is currently being analyzed by John Tuma of MPR Associates, Berkeley, California.

[4] Rates of transfer to four-year colleges have become as high among occupational students—particularly those in business and health—as among academic students (see Grubb, 1991).

[5] High school dropout rates are higher among those in vocational programs than in academic programs, and so many high school vocational students find themselves in the unskilled labor market; but vocational programs intend to have their students graduate—particularly in a period of greater attention to high school dropout rates—so they focus on preparing their students for entry-level jobs in the sub-baccalaureate labor market.

employment at both the secondary and the postsecondary levels depends in crucial ways upon how the sub-baccalaureate labor market operates. Particularly as the movement for accountability in education has begun to affect vocational education with performance measures and standards introduced by the Perkins Amendments of 1990, institutions which seek to improve the prospects of their students need to know how this labor market operates.

Despite the growing importance of the sub-baccalaureate labor market, there is remarkably little information about it. The effects of baccalaureate and graduate degrees on employment have been extensively studied (as reviewed in Leslie & Brinkman, 1988), and of course, there is a substantial literature on the overall effects of education on employment. However, the group with "some college" has not often been examined partly because the most common data sets contain no detailed information about this heterogeneous group and the data that does provide some detail on the group with "some college" is often incomplete.[6] The available results indicate that the economic benefits of sub-baccalaureate education are quite varied: While there are substantial economic returns to associate degrees (for men and women) and to certificates (for women only), the returns for those who enroll in postsecondary institutions but fail to complete programs are highly uncertain. In addition, returns depend critically on the field of study, with economic effects higher for health and technical occupations, and also depend on whether individuals find employment related to their field of study.[7]

Moreover, the most common way of studying the interaction between education and employment—statistical analysis of large data sets—fails to provide much information about *how* formal schooling improves (or fails to improve) employment opportunities. The usual quantitative analysis measures the increase in wages or earnings which can be attributed to different levels of schooling but can say nothing about the reasons for hiring (or not hiring) individuals with more schooling, about the skills that employers look for and the hiring procedures they follow, and about the institutional relationships between providers of education and training and the employers who use that education. That is, conventional analyses describe the outcomes of markets for education and training, but they say little about how those markets operate. Particularly for purposes of improving education and training and making postsecondary institutions more effective, it is crucial to understand the detailed workings of these markets.

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[6] For example, the NLS72, the basis for Grubb (1992b) and Kane and Rouse (1992), includes only a young cohort while many community college students are older; the SIPP data contains much less information on postsecondary education and too few variables for sophisticated multivariate analysis.

[7] These results are based on Grubb (1992b, forthcoming-b) and Kane and Rouse (1992); for a review of earlier studies, see Grubb (1992b).

Methodology: Understanding a Local Labor Market

Our method involves interviewing providers of sub-baccalaureate education—that is, the supply side of the market—and employers, the demand side, in four specific labor markets.[8] In this way we could check the information we received from one side with representatives from the other. For example, if a community college electronics program claimed to have an active advisory committee and a good reputation among employers, we could ask employers of electronics technicians in the same community about the local college, its advisory committees, and their tendency to hire from the college. Because the sub-baccalaureate labor market is so varied and contains so many occupations, we concentrated on six specific occupations/occupational areas (described later in greater detail): electronics technician, machinist, drafter, accountant, business occupations, and computer-related occupations.

The providers of education whom we interviewed included community colleges and technical institutes (or technical colleges), both of which generally offer two-year associate degree programs as well as shorter certificate programs. In some communities—particularly in the city we call Frankton—area vocational schools are also active in providing shorter-term vocational education for adults (as distinct from their programs for high school students), so we interviewed individuals in area vocational schools as well. In general, we did not interview providers of secondary vocational education because enrollments in these programs have dwindled (Clune et al., 1989) and because they have moved away from intensive and job-specific preparation. However, in one community—Cotooli—the high school programs are viewed by employers as important contributors; so there, we did interview secondary providers of vocational education.

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[8] This method draws upon an older, institutional analysis of labor markets (e.g., see Berg, 1970, especially Chapter 4 reporting on interviews with employers; Diamond & Bedrosian, 1970; Gordon & Thal-Larsen, 1969). As labor economics has become increasingly theoretical and quantitative, this kind of institutional analysis has all but disappeared from economics. However, it has reappeared in part within sociology, which is more hospitable than economics to case studies, interview methods, and other qualitative approaches. However, much of the literature within sociology (particularly within the sociology of occupations) tends to examine the structure and evolution of particular occupations rather than the relationship between formal schooling and access to occupations.

In each institution, we interviewed the dean of occupational education partly to get an overview of the institution's occupational offerings, then we interviewed the heads of the departments containing programs in our six occupational areas to get more detailed information about educational programs, local employment opportunities, and the subsequent placement of students. We usually interviewed several instructors within these programs, especially when a department head was unable to provide much information or when a particular instructor was recommended as being knowledgeable. In addition, we interviewed the head of any placement office within these institutions to assess other mechanisms of connection with employers. In all, we interviewed seventy-four educators in eighteen different institutions. We asked these providers of education about the backgrounds and intentions of their students, the nature of their programs, their connections with employers, the nature of the local labor market in the six specific occupational areas, and the common hiring and promotion practices. The questionnaires used are reproduced in Appendix A, which provides other information about the interviews.

In each of the four communities, we interviewed a sample of employers who were likely to hire substantial numbers of individuals in the six occupational areas we emphasized, starting from lists of local employers provided by Chambers of Commerce, employer associations, and local departments of economic development. We also included firms mentioned by employers as important sources of hiring. We tried to interview at least four employers for each of the six occupational areas (and, of course, some employers hired substantial numbers of individuals in several occupations) and to include a range of small to large employers. In each firm, we typically interviewed an individual in charge of hiring—usually a director of personnel in larger firms and a person with varying responsibilities in smaller firms. In addition, where there was a lower-level individual with responsibility for hiring in specific occupations—a foreman or supervisor, for example—we interviewed that individual. Within the four labor markets we examined, we interviewed a total of 152 individuals in 113 firms. The questions we posed (again reproduced in Appendix A) included those about hiring and promotion practices, skill requirements and trends in the nature of occupations, formal and informal relations with local providers of occupational education, and perceptions about the quality of education and training.

Several problems affected our interviews with employers. One was the difficulty of determining appropriate individuals to interview since people at different levels of a firm (e.g., personnel managers versus supervisors) have varying and often inaccurate information about hiring practices and job requirements. A more troubling and pervasive problem involved the accuracy of information we received from employers about hiring standards and job requirements. We asked about hiring practices, promotion policies, patterns of internal mobility, and the like—all empirical questions to which precise answers would require analyzing personnel files but for which we had to make do with the guesses and estimates of our respondents with their inevitable biases and problems of recall.[9] Fortunately, over a relatively large number of employer interviews (slightly over 150), the responses tended to corroborate one another and clear patterns emerged, giving us substantial confidence that our major conclusions have not been distorted by the limits of interviews.

It proved difficult to interview small employers—those with less than one hundred employees—because they hire in any specific occupation so infrequently that there is no regularized practice or policy to report and the information available from interviews is scanty. Despite the fact that small employers seem to account for much of the hiring from community colleges and technical institutes, our sample of employers is biased in favor of medium-sized and larger employers. In addition, the period of our interviews—1991 and 1992—was a recession in most of the country, particularly in manufacturing. Many firms had not hired any new employees in several years, and their responses about hiring practices therefore reflected their recollection of what they did in better times or what they thought they would do when conditions improved. We suspect that the sub-baccalaureate labor market is especially susceptible to the business cycle—as we examine more closely in the first section of this document, "The Characteristics of Sub-Baccalaureate Labor Markets"—so responses from employers might be quite different in boom times.

In each labor market, we attempted to interview a third type of individual—individuals who are neither employers nor providers of education and who might have a broad and unbiased overview of the local labor market. These general respondents might be officials of city or county agencies, especially economic development agencies and service delivery areas of the Job Training Partnership Act, the staff of local Chambers of Commerce or local coordinating agencies, or academics with special knowledge of local conditions. We found only eleven such individuals; there are very few people in an institutional position who have a broad overview of local labor markets.

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[9] Some questions we posed—for example, about promotion policies and earnings—require quantitative analysis to answer definitively. Unfortunately, many employers fail to keep adequate data about their hiring practices, so more precise information is not available. Other issues—for example, the kinds of skills most required on the job—would require ethnographic analysis of the kind Darrah (1990, 1991) has performed, which are enormously time consuming. A thorough examination of any one workplace would therefore require interviews with managers and supervisors, analysis of employee records, ethnographic observations, and interviews with workers. To do this across a sample of firms and across labor markets would be overwhelmingly expensive and time consuming.

This conclusion highlights one of the most difficult aspects of studying sub-baccalaureate labor markets. Markets are, in many ways, abstractions. They result from the interactions of many demanders (employers, in this case) and many suppliers (educational institutions and their students), but each participant experiences only a small part of the market and can therefore describe only a small piece of it. Most of the employers and the providers we interviewed do not think of themselves as operating in a market: They describe their experiences as transactions—hiring a specific individual, finding a particular job, placing students with a specific company—isolated from the other participants in the market. Occasionally, employers will refer to competitors who can lure their employees away by offering higher wages; but, otherwise, there is little sense that markets operate with many participants influencing employment outcomes, wage rates, and the like. To describe an entire market, then, it becomes necessary to synthesize the responses of many participants, each of whom has a very incomplete picture of the market—the approach we have taken through multiple interviews.[10]

Most interviews were tape-recorded and transcribed. The statements from educators and employers we include in this report are therefore direct quotes. We quote individuals when they represent a wider spectrum of opinion and not (unless mentioned) when their views are idiosyncratic.

Choosing Occupations To Examine

Because the sub-baccalaureate labor market contains so many different types of occupations, it would have been impossible to examine all of them; and asking employers and education providers about their employment practices and programs in general terms would have led to overly vague responses. Therefore, we decided to concentrate on six occupations/occupational areas, typical in many respects of those in the sub-baccalaureate market and widely represented in the occupational offerings of most community colleges and area vocational schools. These six—electronics technician, machinist, drafter, accountant, business occupations, and computer-related occupations—include several occupations that have been part of vocational education virtually from its inception (including machinist, drafter, and business occupations) and several that are relatively new (electronics technician and computer-related occupations); several that predominate in manufacturing (electronics technician, drafter, and machinist) and therefore have been susceptible to the general decline in manufacturing in this country, and several that are not especially allied with manufacturing (accountant, business occupations, and computer-related occupations); several that are highly gender-segregated (electronics technician, drafter, machinist, and certain business occupations[11]), and several which are more integrated (accountants and computer-related occupations). All these occupations have been changed by technological advances, particularly those associated with computers. The changes in machining and drafting, which have become quite different from the occupations for which vocational education traditionally prepared students, provide good examples. Each of these occupational areas, with the possible exception of business occupations, requires certain specialized knowledge and therefore is appropriately included in a study of sub-baccalaureate labor markets. By design, we did not include any health occupations—an important area within many community colleges and technical institutes and a large component of the sub-baccalaureate labor market—partly because health occupations have been extensively studied (especially by Hudis et al., 1992) and partly because they are heavily regulated—unlike virtually all the other occupations of the sub-baccalaureate labor market. (This regulation leads to labor markets we term "organized" or "codified," discussed in "The Providers of Education and Their Connections to Employers" section of this document, with distinct characteristics and some clear advantages.) While the selection of any six occupational areas is to some extent arbitrary, these six are fairly representative of the spectrum of occupations in the sub-baccalaureate labor market.

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[10] Of course, the other way to describe a market is to concentrate on the results as is typically done through the statistical analysis of wages and earnings, employment levels, and trends. However, as mentioned before, this approach ignores the details of what demanders and suppliers do; in economists' terms, it focuses on the reduced-form effects of demand and supply—wages and employment—and neglects the components.

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[11] While business occupations as a whole are not particularly gender-segregated, particular business specialties are. Managerial programs tend to be dominated by men while women predominate in the secretarial and clerical programs and in the lower levels of business occupations which have less upward mobility.

However, there are substantial ambiguities in the specific jobs at the sub-baccalaureate level within each of these broad occupational areas—ambiguities which are not always clear to students and which can also generate a mismatch between what education providers teach and what employers use:

- *Electronics technician*: Programs labeled "electronics" vary widely. Some short-term programs such as those found in area vocational schools and in job training programs funded by JTPA and Job Opportunities in the Business Sector (JOBS) teach individuals little more than the soldering techniques necessary to be assembly-line workers in plants manufacturing computers and other electronics and electrical equipment. Other lengthier programs—especially two-year associate programs—teach individuals about a wide variety of circuits and electronic devices and, in theory, prepare them to be highly autonomous technicians, including those responsible for troubleshooting and repairing advanced electronics equipment and those who work in research and development. Correspondingly, the jobs in which electronics technicians are found vary from relatively low-level repetitive assembly-line work at close to minimum wage, to highly skilled, well-paid technicians with crucial responsibilities in maintaining electronics equipment in automated workplaces, to individuals working in research and development who are operating more like research scientists. It therefore becomes crucial to ascertain where on this continuum a particular program and particular job falls.

- *Machinist*: As in the case of electronics technicians, both jobs and programs to prepare machinists vary widely. Some individuals called machinists may operate only one or two machines and are really repetitive assembly-line workers. Some individuals working with computer numerically controlled (CNC) machines may be little more than operators, putting raw materials into the machine and taking out the finished product. More advanced machinists are able to operate a variety of machines and can work independently from blueprints; the programs to prepare them are consequently longer and more varied and incorporate blueprint reading and mathematics as critical skills. At the high end, skilled machinists and tool and die makers have the traditional craft skills, the ability to program CNC machines, and knowledge of electronics as well. Therefore, short-term programs (particularly in job training programs) provide an initial introduction to the tools and equipment associated with metal-working. However, the training is so brief (in some cases as little as fifteen weeks) and the positions students enter are so poorly paid (often little more than minimum wage) that these programs are preparing individuals for repetitive assembly-line work in manufacturing facilities. One- and two-year machining programs provide more extensive preparation, of course, on a variety of different machines as well as varying amounts of training on CNC machines. However, as we describe in the "Employers in the Sub-Baccalaureate Labor Market" section, employers strongly prefer experience over formal training and do not hire students from such machining programs into skilled and well-paid machinist positions.

- *Drafters*: Certain skills taught in drafting programs—reading blueprints and diagrams, for example—are useful in a variety of manufacturing-related occupations while drafting skills themselves are widely used in manufacturing, construction, design, and architecture. Because drafting is a skill required in a variety of occupations, drafting programs serve these other occupational areas as much as they prepare individuals for drafting jobs. Highly specialized forms of drafting are often required; for example, in one community, the state department of highways is an important employer of drafters who produce the drawings of new roads—"delineators"—from which contractors make bids, and one area vocational school was considering a program for pipe drafters—individuals who produce drawings for the laying of pipe. In turn, this specialization means that specific experience is often required for drafting positions and, as in many other occupations, formal schooling alone is insufficient. Most postsecondary programs and most drafting positions have moved toward computer-aided design (CAD) systems, though in practice, the mix of CAD and older methods of drafting on conventional drafting boards varies substantially.

  Increasingly, drafting seems to be handled by temporary agencies because the use of drafters is highly variable. In many firms that hire their own drafters, it is quite common to hire only a few. To some extent, the advent of CAD systems means that engineers, designers, and architects can do some of their own drafting, reducing the need for a separate category of drafters who convert rough sketches into finished and correct drawings. As one personnel manager for a highly sophisticated manufacturer stated, "The pure draftsmen are now a dying breed."

- *Accountant*: Independent accountants and CPAs are almost invariably individuals with baccalaureate degrees. At the sub-baccalaureate level, therefore, individuals hired in accounting are almost always accounting *clerks* engaged in data entry using spreadsheet programs or in other bookkeeping routines. As the institutional researcher for a community college in the Palmdale area said, echoing comments from the other areas we examined,

> If you're in accounting and get an A.A., you're not going to be an accountant. The accounting world down here is strictly B.S./B.A. If you graduate here in accounting, you're going to work in one of the smaller firms and you're going to be a high-class bookkeeper.

The aura of professionalism surrounding the title "accountant" is therefore misleading; at the level we analyze, most people in accounting positions are clerical workers with some knowledge of accounting practices and spreadsheet programs, often doing routine data entry. A few employers referred to individuals at this level as paraprofessional accountants or "para-accountants," and one community college provides two distinct programs, one for paraprofessional accountants and one for financial accounting that is articulated with a baccalaureate accounting program.

- *Computer-related occupations*: Virtually every community college and technical institute has extensive offerings within departments labeled "computer science" or perhaps "computer information services"—including a variety of courses in programming, systems analysis, and computer architecture, including some languages that are almost obsolete (like COBOL). However, the majority of *enrollments* appear to be in lower-level courses, including computer literacy and other introductory courses, and courses intended to teach individuals low-level applications (e.g., specific word processing and spreadsheet programs). Students in these courses typically learn computer applications required for other positions—for example, word processing for secretaries or spreadsheet applications for accounting clerks; indeed, there is a substantial overlap between computer-related classes and business occupations. Many other students are enrolled in even more basic computer literacy or computer familiarization courses rather than preparing for careers in computer-related occupations themselves. As one instructor acknowledged,

> We call ourselves computer science, but we're really more computer information science. . . . We have more of a data processing, MIS [management information service], IS [information services] type orientation. . . . We're sending people to such fields as insurance, banking, [and] finance with computer skills.

As in the case of accountants, the positions normally considered computer programming now require baccalaureate or even graduate degrees,[12] and it is virtually impossible to be hired as a programmer from a community college.[13] Other positions that might be filled with a two-year degree—computer operators, for example, who used to operate mainframe computers and mount tapes and handle computer cards and batch processing—have all but disappeared.[14] Some computer instructors inform their students about this development; as a faculty member at Rosefield City College reported,

> I have tried to stress to students that a two-year degree is nice . . . but don't be surprised if somebody with a four-year degree beats you out. . . . You had better plan on getting a four-year degree.

Indeed, many students in community college computer programs start with the intention of eventually transferring to four-year colleges.

- *Business occupations:* Virtually every community college has an extensive business program with courses ranging from typing and shorthand to business procedures and organization, business law, and related academic courses like business math and business English. These programs prepare students for a range of occupations, including secretarial positions, administrative assistants, office managers in small businesses, and lower- and mid-level managers. However, almost uniformly, the employers in our four communities were unable to identify occupations for which they would hire individuals from a business program since the area is so vague and encompassing. The positions for which business programs train people are "all over the map," as one personnel director mentioned. Another responded, "Business management is too general. Those types of people go everywhere. It is difficult to know where they are employed." In addition, the elimination of excess supervisors and the flattening of hierarchies in many firms have eliminated middle management positions for which community college business programs might be appropriate. As a personnel supervisor in Cotooli commented,

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[12] On the elaboration of the computer field and the development of hierarchies, see Greenbaum (1979).

[13] Arnold (1988) studied the 1981-1986 graduates of a community college in the Palmdale area and found that they experienced difficulty in finding entry-level programming jobs without experience. Several individuals hired into programming jobs reported that they had passed through a window of opportunity that was being closed by increasing reliance on B.S. and M.S. programmers. The most consistent predictor of salary was computer-related experience, confirming once again the importance of experience. She speculated that community college graduates were being squeezed out of programs into "sub-programming" jobs—a possibility that, about ten years later, has clearly taken place.

[14] One exception is a large computer processing operation in the Rosefield area which requires associate degrees in computer science for its technicians.

> The PC [personal computer] has decimated the middle management rank, whose sole purpose was to supervise ten or fifteen clerks. That job doesn't exist anymore. So, I don't know what someone with an associate's degree in business management would do with it.

As a result, managerial positions normally require a baccalaureate degree or are filled by individuals who acquire extensive experience within a particular firm. As the director of training for a large Cotooli firm mentioned,

> I think the majority [of vocational institutions] are falling into the trap of preparing their students for jobs that aren't out there. . . . The two-year schools that are producing people trained in business management, accounting—whatever—are competing [with four-year graduates] directly, and I think they'll lose every time without something else behind it—experience or the opportunity or what have you.

We suspect, then, that the majority of individuals in community college business programs go into secretarial[15] and clerical positions or entry-level positions like bank tellers[16] or into relatively low-level managerial positions like office manager for very small firms.[17]

In sum, the combination of hiring preferences, the range of sophistication among education and training programs, the fact that most truly professional occupations now require baccalaureate degrees, and the fuzziness in some occupational areas (especially business and computer-related occupations) means that the six occupational areas we chose for extensive analysis are often ambiguous. As we will see in greater detail in subsequent sections, community colleges and technical institutes often prepare individuals for lower-level positions than students might imagine or prepare them for occupations where employers do not typically hire directly from educational institutions. The result is often a mismatch between the titles of educational programs and the realities of the sub-baccalaureate labor market.

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[15] Even the numbers of secretaries have been reduced by the PC revolution as letters have been replaced by electronic mail and managers do their own typing and as computers generate reports that secretaries used to complete.

[16] The personnel director of a credit union in Rosefield reported a substantial surplus of individuals with two-year business management degrees; in his firm, they were hired only as tellers.

[17] One manager of data analysis in a large Cotooli firm has previously been head of a business department in a proprietary school and claimed that their students had no trouble finding employment. However, the director of training later confirmed that the firms hiring the students were tiny—typically less than ten people, had no prospects for advancement, and were going out of business at a great rate. Once again this anecdote clarifies that information about initial jobs can be misleading; stability and upward mobility are crucial.

Choosing Local Labor Markets

We chose four distinct labor markets in which to carry out our interviews. In part, interviewing employers and education providers in specific areas was necessary because this is the only way to examine both sides of a market; that is, we needed to learn about relationships between specific employers and specific educational institutions, a situation that was possible only if those we interviewed were within the same area. In part, the focus on specific areas emerged from earlier research (Grubb & McDonnell, 1991; McDonnell & Grubb, 1991) that indicated that sub-baccalaureate labor markets are (with some clear exceptions) highly local.[18]

Because there is substantial variation among local labor markets—most obviously, in the mix of sectors and occupations and also in the educational institutions present and their interrelationships—we anticipated that we would find variation among local labor markets in the interaction between providers and employers as well. Therefore, it was desirable to choose areas with substantial diversity among them. In addition to diversity, the criteria for choosing areas included the following:

- *Size*: We did not want to choose either very large cities with too many providers and employers nor did we want small, rural communities with few employers and a small range of occupations. The areas we chose were therefore mid-sized cities.
- *Boundedness*: Some urban areas lack distinct boundaries since one city flows into the next; the most obvious examples include large urban sprawls—Los Angeles, for example—but can also include smaller areas. In unbounded areas, firms are likely to hire from providers spread across a wider geographic area and educational providers may also target geographically dispersed firms. It is therefore difficult to develop a complete description of the interactions between providers and employers

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[18] This earlier research interviewed providers of education and training in eight local labor markets: Sioux City and Des Moines, Iowa; Jacksonville and Miami, Florida; Scranton and Philadelphia, Pennsylvania; and Fresno and San Jose, California.

through interviews, and the logistics of interviewing are more complex. Unfortunately only two of our four communities—Frankton and Rosefield—can be considered reasonably bounded.

- *Presence of several postsecondary education providers*: Some communities (especially in rural areas) lack community colleges and other postsecondary providers of occupational education and some are dominated by a single institution (usually a community college).[19] Because we wanted to see how employers compare students from different postsecondary institutions, we chose communities with a variety of providers.

While the choice of four communities is unavoidably arbitrary, the four we examined do provide substantial variety. (Fuller descriptions of these four communities are presented in Appendix B.)

- Frankton is a small city of about 350,000 people, with 650,00 in the area,[20] in the midst of a rich farming region. While agriculture services and processing form the core of its employment, it has been diversifying into services and light manufacturing. Its community college with two campuses and a shorter-term training center is well-known within the state for its customized training; in addition, the local providers of vocational education have been quite well coordinated. An area vocational school north of the city is also active in shorter-term training, and a community college twenty miles north of the city is another participant.

- Palmdale is a city of about 750,000, though the standard metropolitan statistical area of which it is a part is considerably larger with a population of 1,500,000. Its employment has concentrated on computer and other high-tech development and manufacturing (including aerospace firms), though it has the full range of other occupations typical of the sub-baccalaureate labor market. Because it is a somewhat sprawling area, its employers can draw on community colleges and area vocational schools within the city of Palmdale and also on two well-known, middle-class community colleges located north of the city.

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[19] Among the eight communities examined in Grubb and McDonnell (1991), two—Sioux City, Iowa, and Jacksonville, Florida—are dominated by the local community college. While it would be interesting to examine hiring practices in such communities, there might be less variation in the responses with only "one game in town."

[20] These are 1990 populations from the *Statistical Abstract of the United States, 1991* (U.S. Department of Commerce, 1991), and the area figures are those for the primary metropolitan statistical area.

- Rosefield is a rapidly growing city, the center of an area that now has a population of almost 1,500,000, with the city itself having about 375,000 and the remainder sprawled in a series of suburbs. While employment in government and services formed the core of its economy, it has diversified into high-tech and light manufacturing as well. It includes a system of three community colleges as well as a state college.

These first three communities are all located on the west coast because of the need to carry out interviews without excessive expense. However, the desirability of finding a community in a different region and with a greater emphasis on manufacturing forced us to search for another community:

- Cotooli is a city of about 350,000, the center of an area of 1,450,00 people located in the Midwest. Not only does it include a substantial amount of manufacturing, it is also one of the few manufacturing-oriented communities in the country that has not been devastated by the recession of 1990-1992—partly because it has developed a relatively diverse economy, including sectors like consumer goods that are relatively recession-proof.[21] Cotooli also proves substantially different from the other three communities because of the dominance of a co-op program linking education providers and employers, a program which is more fully described in "The Providers of Education and Their Connections to Employers" section.

Because of Cotooli's location, it was necessary to develop a different method of interviewing. While interviews in Frankton, Palmdale, and Rosefield took place in person, in Cotooli all interviews with education providers took place over the phone. Interviews with employers, always more difficult than those with providers of education and training, took place first in a forum attended by eleven employers and then during a one-week round of intensive interviews with some telephone follow-up. This method seemed to yield information comparable to that of the personal interviews in other communities.

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[21] We chose Cotooli after phone calls to a number of communities in different regions of the country with substantial amounts of manufacturing. In the others, local respondents—usually staff of the Chamber of Commerce or of the city's economic development agency—described conditions in which manufacturers had been laying off workers for the past two or three years, poor conditions in which to interview about hiring practices.

In this monograph, we refer to these four communities by pseudonyms. We do this partly because we promised our respondents anonymity; certain employer representatives were reticent to talk even with this guarantee, as were a few educators. In addition, we have come to some critical conclusions about certain education and employment practices, and anonymity is a way to prevent unnecessary embarrassment—unnecessary because the practices we identify are widespread and because we want to concentrate on the structural aspects of sub-baccalaureate labor markets and not the idiosyncrasies of particular organizations within it.

The Plan of This Report

"The Characteristics of Sub-Baccalaureate Labor Markets" section describes some characteristics of local sub-baccalaureate labor markets, drawing on interviews with both providers of education and training and those with employers. These characteristics differentiate the sub-baccalaureate market from that for the professionals, managers, and technical specialists who typically have baccalaureate and advanced degrees.

"The Providers of Education and Their Connection to Employers" section concentrates on providers of education and training, describing their students and offerings and examining their various connections to employers.

The "Employers in the Sub-Baccalaureate Labor Market" section emphasizes employers, especially the skills they require of their employees, the hiring and promotion criteria they use, their relations with education providers, and some emerging trends in employment.

The "How Well Do Sub-Baccalaureate Labor Markets Work?" section summarizes the evidence about how well sub-baccalaureate labor markets work—particularly for students who seek entry (or re-entry) into employment and for employers. In addition, a crucial question is how responsive the institutions of the sub-baccalaureate labor market are to changes, particularly those taking place as a result of shifting technologies, new forms of work organization, international competition and sectoral shifts, and the other changes that have been affecting our economy as a whole.

Finally, we present a series of recommendations in the "How Well Do Sub-Baccalaureate Labor Markets Work?" section. Some practices in occupationally oriented institutions—and their connections to employers in particular—are weak and in need of reform. It is therefore relatively easy to identify practices that could be changed—by local administrators as well as state and federal policymakers—to make these institutions more responsive. It is equally clear, however, that employers bear substantial responsibility for some problems we identify. Since employers can undermine any educational reform by the incentives and disincentives they create in employment policies, their participation is crucial to reconstructing the education and training system. Here the problem of reform is more difficult since there are relatively few mechanisms by which public policy can affect employment practices. We therefore summarize a series of problems caused by employers and their employment practices and some tentative ways to address them as a way to open the difficult question of what responsibilities employers should bear in order to improve the operation of sub-baccalaureate labor markets.

THE CHARACTERISTICS OF SUB-BACCALAUREATE LABOR MARKETS

The sub-baccalaureate labor markets we examined have a number of distinct characteristics which emerged clearly in all four local areas. These characteristics have consequences both for providers of education and training and for employers and in many ways are necessary to understanding both the nature of education providers (the subject of "The Providers of Education and Their Connections to Employers" section) and employment practices (in the "Employers in the Sub-Baccalaureate Labor Market" section). The characteristics we describe in this section differentiate the sub-baccalaureate labor market both from that for individuals with B.A. and graduate degrees and from the unskilled labor market.

Long-Term Changes in Organization and Technology

Three interrelated changes, much discussed in the literature on the direction of the American economy,[22] were unmistakable in the firms we examined: a change in the organization of work; the slow introduction of new technologies, with new and old production processes coexisting; and the greater use of computer applications. The dominant change in the organization of work has been the trend toward flatter hierarchies within firms with fewer supervisory layers, requiring individuals to perform a wider variety of tasks and take on greater responsibility for the work they perform. In part, this change has come from greater competitive pressures, forcing employers to economize on labor. It has also resulted from the introduction of computers in many aspects of production, forcing individual employees to perform a greater variety of tasks and requiring them to master additional computer-related skills. As the manager of a medium-sized manufacturer of vending machines in the Frankton area described,

> We can't afford to have one person who just does electronics and one who does all of the others [i.e., the mechanical rather than the electronics machinery]. We're a small company, and the whole drive is to be more flexible. The more flexible you are, the more skills you have. If you want to find a machinist who can also troubleshoot all the equipment, it's very difficult.

The most obvious manifestation of workers having a greater variety of responsibilities is that older occupational divisions are no longer clear. In the occupations we examined, for example, the distinction between the occupations of machinist and electronics technician have begun to blur: With the advent of CNC machining, individuals who at one point were traditional machinists—skilled on a variety of conventional metal-working equipment like lathes and drills—now need to know some computer programming and electronics as well since they may need to diagnose and repair the newer CNC machines or programmable logic controllers (PLCs) that are now ubiquitous in manufacturing processes. The individuals who serve as repairmen and mechanics—crucial positions in continuous-production facilities—now require the skills of machinists, electricians, and electronics technicians (to diagnose and repair computer-driven equipment). For example, a personnel director for a glass manufacturer in Frankton commented,

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[22] See, for example, Brown, Reich, and Stern (1992) characterizing the difference between the new form of employment they describe as SET (security, employee involvement, and training) rather than the older JAM (job characteristics, adversarial relations, and minimal training) and the discussion of the "high skills equilibrium" versus the current "low-skills equilibrium" in *American's Choice: High Skills or Low Wages!* (Commission on the Skills of the American Workforce, 1990). It is important to note that the firms we examined have made only some of the changes associated with SET and that movement to a new equilibrium may be slow and incomplete.

> It just seems to be getting much more complicated than just the two-year tech. And maybe they're getting left out because they don't have the other half. I don't see industry as being computer programmers over here and electronics people over there, and if there is an electrical problem or a hardware problem you call the electronics tech and if there is a software problem you call the programmer in. I guess I see those people becoming more and more one person.

Similarly, an electronics instructor in Rosefield described the skills required of students in the future:

> Metallurgy, pneumatics, hydraulics, mechanics, electronics—these are the kinds of things that I see coming together to give the student a broad-based, saleable skill. And those are the ones we're going to have to address more. I don't see electronics as being the ultimate: I see it being a portion of everything.

In addition, a manager of computer programmers for a Palmdale company predicted the slow elimination of programming as a separate occupation:

> Concurrent programming will be the concept of MIS in the future. That means you're not going to be a programmer anymore. You're going to be an analyst. You're going to be a user; you're going to be a solution provider, instead of just doing programming. So this group of people, they are undergoing a different type of training at this moment to work with users. There are going to be big changes.

For jobs whose boundaries are expanding, postsecondary vocational programs are often too narrowly defined since they provide only a subset of the skills required:

> The problem we have is finding a two-year [electronics] tech person who wants to be a grease monkey as well. . . . We have a lot of people come in and want to do the electrical part, and they are these people that have a two-year degree, and they may have been doing electrical tech work at a company that has a little different structure from ours, and that's all they do. . . . But this guy doesn't want to take a motor out; he doesn't want to go to the top of the material elevator and pull a belt up that thing with three other guys and end up dusty from head to toe.

In this firm, the solution to the inability to find sufficiently widely trained individuals was to set up a training program with a local private vocational school that was customized to fit the firm's requirements. A similar problem arose in the Rosefield area. As a human resource manager for a large computer manufacturer commented,

> Most community colleges seem to train electronics techs for bench tech positions. But jobs [in this firm] are very mechanical. A mechanical aptitude is necessary to do electronic work. A lack of mechanical training is a problem with community college training. . . . We also need communications and teamwork. The line techs are middlemen [between production-line workers and managers], and they have to work with production and engineering. They have to present ideas and reports to managers. [At the same time], this is a dirty job; it's not a suit and tie job.

The addition of communications skills as technicians need to communicate with managers or with vendors of complex equipment complicates the requirements still further; numerous employers complained about the lack of communications skills in employees whose technical training is adequate to their jobs (as we will see in greater detail in the "Employers in the Sub-Baccalaureate Labor Market" section).

Similarly, the boundaries among various business, accounting, and computer-related occupations have blurred as employers use individuals in positions that require them to know computer applications like spreadsheets and word processing, enough accounting to complete spreadsheets, and the business procedures that a specific firm uses. Furthermore, with greater responsibility, individuals in nontechnical positions (like accounting and business occupations) may need to know more about the technical side in order to identify and resolve problems. As the manager of accounting in a high-tech firm explained,

> As [the firm] changes jobs and we grow [employees] into varying areas, adding additional responsibility, they have to understand a lot more from the business aspect but also from the technical aspect, particularly on the accounting side.

While the blurring of occupational boundaries appears to have taken place with a wide variety of employers, it seems especially prevalent among the employers we examined for two reasons. One is that while large employers can still afford a detailed division of labor, the small and mid-sized employers which dominate the sub-baccalaureate labor market—particularly among recent graduates of community colleges—cannot. The most obvious manifestation among educational providers of changes in work organization has been the proliferation of courses in total quality management (TQM), particularly in contract education. In the community colleges we examined, the demand for TQM has expanded enormously. As a philosophy espousing that all employees be more customer-oriented and responsible for quality at every stage of production and a method for decentralizing decision-making and making continuous improvements, TQM is a simple idea; but the emergence of TQM as a "movement" reflects the greater responsibility of many more employees within workplaces with flatter hierarchies, fewer supervisors, and a greater range of tasks for each employee. As a staff member with the contract education division of Frankton Community College remarked,

> As more companies talk about total quality management, they push the responsibilities down to the beginning worker, and they've got to make those decisions and understand the processes well enough to deal with that. When you talk to CEOs, they're going to talk literacy stuff. You talk to the supervisors at the entry level and they want technical skills.

To clarify, a reorganized production facility requires a greater range of skills, leading to the situation where individuals at different levels of a firm stress the importance of different skills.

A second change is technological rather than organizational: Small- and medium-sized firms have introduced new technologies—especially computer-driven technologies—slowly so that production facilities include a hodgepodge of ancient and modern equipment and many which are hybrids made by retrofitting traditional machinery with computerized elements. As one foreman of a firm manufacturing cable described,

> People who come out of school who've been into the new technology—transistors, PLCs [programmable logic controllers], digitals—I take them over here next to a DC drive, which is one step above tubes, and they don't understand it. American businesses suffer with what we've got as long as we can make it run. You get out of school, you don't expect to see that because they don't teach you that.

The only exceptions to the tendency to produce with a mix of old and new machines occur within sectors that are entirely novel, exemplified by the producer of lasers in Palmdale, or in those few production facilities—for example, the manufacturers of robotics equipment in Cotooli—that are showcases for new technology. Otherwise, most operatives and technicians have to be able to work on a range of traditional, electro-mechanical machines and modern, computer-based equipment and need both the craft skills of the traditional craftsman—including the ability to cobble together repairs with tricks and baling wire to outmoded equipment—at the same time that they can troubleshoot computerized machines.

The third characteristic change, related to the first two, is the ubiquity of computer applications. Secretaries, accounting clerks, and most other business occupations use word processing and spreadsheet programs; drafting has moved to CAD systems; most machinists now work with at least some CNC machines or with older machines which have been upgraded with electronic controls; and, of course, electronics technicians and computer-related occupations are positions which have emerged in response to the burgeoning of computer applications. Of course, some computer applications used in jobs within the sub-baccalaureate labor market are not particularly advanced. Many—word processing and spreadsheet programs, for example—do not require much more than reading a manual and a little on-the-job practice even though community colleges and other educational providers devote entire courses to teaching them. Even CAD and CNC systems can be taught on the job, particularly to individuals with experience in conventional drafting and machining. Computer-related skills can therefore be learned in a variety of ways—in formal education, on-the-job, or in other informal ways (e.g., learning at home or through recreational use of computers). However, the emergence of computer-based skills does provide an additional role for education institutions to play in preparing the workforce.

In response, virtually every educational provider in our sample has expanded its range of computer-related offerings. These range from "computer literacy" courses, providing an introduction to computer terminology and simple procedures, to courses in specific word processing programs, spreadsheets, simple programming languages, the use of CAD in drafting courses, and introductions to CNC machines in programs for machinists.[23] In addition, customized training departments of community colleges which provide short-term courses to specific firms (also referred to as contract education) usually include many computer applications in their programs to upgrade the skills of current employees.

Educational providers have been responsive, then, to the changing demands of work. However, these changes have not yet been enough to make postsecondary education more crucial in gaining access to employment within the sub-baccalaureate labor market. As long as the skills necessary for new forms of work can be obtained on the job, employers still appear to prefer experience to formal education in their hiring criteria, as we will see in greater detail in the "Employers in the Sub-Baccalaureate Labor Market" section.

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[23] It is difficult for educational providers to offer more than an introduction to CNC machining because of the costs of the machines themselves. The issue of keeping up with rapidly advancing and expensive technology is examined in greater detail in "The Providers of Education and Their Connections to Employers" and "Employers in the Sub-Baccalaureate Labor Market" sections.

Even though work is changing in the direction of a workforce with nominally higher skills and responsibilities, the conventional corollary—that additional formal schooling will be necessary for large fractions of the workforce—does not necessarily follow.

Not surprisingly, the pace of change toward new forms of work organization and toward the greater use of computers varies from area to area. Frankton, which is at its core an agricultural community, has been especially slow to convert to computer applications, and some education providers complained that their computer-based programs (in CAD and accounting specifically) were ahead of developments in employment. On the other hand, employment in the Palmdale area, an important center of high-tech development and manufacturing, and in Cotooli, with many firms committed to advanced manufacturing technology, has been much quicker to change. The result is substantial variation across local labor markets and around the country in work organization and technological developments in the sub-baccalaureate labor market.

Cyclical Variation in Employment and Education

A second obvious characteristic of jobs in the sub-baccalaureate labor market is that hiring is strongly cyclical, decreasing to the vanishing point during recessions (including the period of this study) and increasing during boom times. Employment in the sub-baccalaureate labor market is more cyclically sensitive than it is in the market for professionals and managers with advanced degrees, who have greater job security because of their control over production, their greater firm-specific skills,[24] their power over hiring and firing, and the like. A common pattern among the employers we interviewed was to lay off less well-educated workers during the current recession and substitute better-educated managers and technicians since less well-educated workers with less specific training can more easily be hired when economic conditions improve. In addition, many individuals from community colleges find their initial employment in small firms, and such firms are more likely to go out of business during recessions. Between the layoffs within well-established firms and the demise of small businesses, individuals in the sub-baccalaureate labor market are more likely to find themselves in the job market during recessions. This helps explain the cyclical variation in enrollments in community colleges and technical institutes examined below and in the large amount of retraining (rather than initial training) that takes place in these institutions.

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[24] Although there has been an increase in firms providing training to their sub-baccalaureate employees, firm-sponsored training—much of which has firm-specific components—still predominantly goes to upper-level managers and professionals (see Bowers & Swain, 1992). In turn, firms are less likely to let go of their specifically-trained employees since they lose the benefits of such training (see Becker, 1975, Ch. 2.)

Unfortunately, there are many negative consequences to the cyclical variation of employment in the sub-baccalaureate labor market. The most obvious is simply that intermittent employment reduces the earnings of individuals in this segment of the labor market; stability in employment and access to positions where employment is more continuous become more important considerations for individuals deciding which educational programs and occupations to enter.

A more subtle consequence of intermittent employment is that hiring standards and procedures are less well codified: Procedures developed during periods of hiring are abandoned during recessions so that they are constantly being developed anew. Many employers we interviewed, having done little hiring during the recent recession, were vague about their employment standards; the skills they require; and the tests, interviews, and other hiring procedures they use simply because there has been no need to have such procedures. Even among those firms who have been adding new workers, their hiring policies prove to be quite informal, as we will see in the "Employers in the Sub-Baccalaureate Labor Market" section. Particularly in a world of substantial cyclical variation, the notion of a "hiring policy"—something that prospective employees, students in postsecondary institutions, and educational providers can count on—does not exist, and there is greater uncertainty about what employers want.

Still another consequence of unstable employment is that the incentives for substantial investment in skills over long periods of time are weak. Among the occupations we studied, this became clearest in the case of machinists. There is a long history of complaints from employers about "shortages" of skilled machinists, and the employers in our sample were no exceptions: Many mentioned the long period of both formal and on-the-job training necessary to become a skilled machinist or repairman and bemoaned the apparent unwillingness of young people to invest the time necessary. At the same time, the same employers had laid off many of their machinists in the recent recession and had failed to hire for two or three years. There are, as a result, no economic incentives for individuals to spend long periods of time developing a broad range of machining skills. As the staff director for an employers' association in Frankton commented,

> One of the reasons [for shortages] is that we can't get employers focused that this is a long-range thing—that if you think you need three or four years to go through more sophisticated programs, you've got to have meaningful jobs downstream.

The contradiction between employers' desire for skilled machinists and their unwillingness to provide stable employment and economic incentives was noted by a few education providers.

Cyclical variation affects the education providers of the sub-baccalaureate labor market as well. Enrollments in community colleges and technical institutes are highly sensitive to the business cycle: During recessions, enrollments expand substantially then contract once employment increases again.[25] The conventional explanation is that the opportunity cost of attending school is low during recessions; but an equally plausible argument is that individuals who have been laid off decide to undertake retraining in order to move into occupations where employment is still available or is more cyclically stable. Whatever the explanation, the consequence is that community colleges and technical institutes find themselves during recessions with greater numbers of older students with some experience in the labor market and needing retraining—not, as most four-year colleges find, younger students seeking initial entry.

The cyclical variation in employment within the sub-baccalaureate labor market, on the one hand, and in educational enrollments, on the other, creates a special dilemma: Enrollments in community colleges and technical institutes increase just as employment opportunities dwindle. Unless the period of time in such institutions precisely matches the length of the recession,[26] we should expect to see placement rates decline precipitously during recessions and increase during expansions (and similarly, placement rates should be much higher in low unemployment regions than in high unemployment regions). Particularly with the current movement for accountability and performance measures in education, it is important to remember that the standard of "acceptable" employment rates may vary both regionally and cyclically.

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[25] See Betts and McFarland (1992), who estimate that a one percentage point increase in the unemployment rate increases full-time enrollment by 4.5% and part-time enrollment by 3.5%. It is important to note that—contrary to the human capital model in which education enrollments should be responsive both to the benefits of education (e.g., higher earnings) and to the direct and opportunity costs—the empirical literature suggests a greater responsiveness to costs than to benefits (Betts & McFarland, 1992; Grubb, 1988). Of the many analyses of enrollment, only Mattila (1982) has confirmed a strong response to the economic benefits associated with formal schooling.

[26] If students stay enrolled in a community college (by combining coursework with intermittent employment) until the recession ends and they can find more permanent employment, then they can effectively match the period of enrollment to the length of the recession.

Because of enrollment variation, another effect of business cycles is that programs are dismantled during recessions. Community college administrators are acutely sensitive to the marginal revenues (tuition plus state reimbursements) and the marginal costs (instructor salaries plus equipment costs) of various courses and programs and move relatively quickly to close programs whose enrollments fall below the break-even level. In the Palmdale area, therefore, several electronics programs had closed by 1991. At the same time, deans claim that they respond to advisory committees of employers in establishing new programs, raising the prospect that programs closed in recessions will be started up again during the next expansion. While we did not observe any special consequences of closing and opening programs over the business cycle, this pattern may be quite wasteful of administrative resources.

The Local Nature of Sub-Baccalaureate Labor Markets

In each of the four labor markets we examined, the sub-baccalaureate labor market is almost entirely local. In their search for employees, firms generally advertise locally; if they establish relations with any educational providers, they do so with community colleges or area vocational schools within the same community. Community colleges, technical institutes, and area vocational schools target local employers as well, and deans and instructors report that their students search for employment almost exclusively within the local community. In contrast, employers routinely search statewide and nationally for their upper-level professional and managerial positions, and such individuals are much more mobile (and mobile for job-related reasons) than are less well-educated individuals.[27]

We found only a few exceptions to the local pattern of sub-baccalaureate labor markets. One appeared in cases of highly specialized skills. For example, one company that produces lasers in the Palmdale area hires most of its workers from a community college in Iowa and from a technical institute in Texas with a similar laser program. In the case of the Iowa community college, a former employer had established a program there designed around the company's requirements so that the college provided virtually firm-specific instruction.[28]

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[27] See also Grubb and McDonnell (1991) for confirmation of the local nature of these labor markets. CPS data on mobility patterns confirms that individuals with less than a B.A. degree are half as likely to move as those with B.A. and graduate degrees and are much less likely to give job changes as reasons for moving (see Bureau of the Census, 1989).

In a very few cases, employers have established good working relations with distant community colleges. The three clearest examples (out of the many employers we interviewed) were all relatively large firms. One consistent case of hiring outside the local area involved a private four-year technical school in Phoenix, mentioned independently by several employers in both Rosefield and Palmdale. While the advantage of this particular school is not clear,[29] it has clearly established a stable reputation and relationship with numerous employers. The only other example involved another Arizona private trade school that prepares drafters and whose intensive training and selection ("students from all over pay to go to school, and they pay a lot") were cited by one recruiter as reasons for their students' success. However, these were the only two examples in our four labor markets of extensive reliance on nonlocal proprietary schools, so we consider them anomalies.[30]

In addition, local educational decisions sometimes force employers to search further for their new hires. For example, when electronics programs in the Palmdale area closed because of the lack of demand during the recession, one employer reported searching in Rosefield for technicians. (At the same time, a Rosefield employer mentioned plans to recruit from an electronics program of a Palmdale-area community college that had closed down, indicating a lack of familiarity with existing programs.) In addition, employers report that they advertise more widely during periods of expansion and shortages.

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[28] In this somewhat odd case, the local community college's laser program did not seem to be able to place its students with the local company because of its preference for the Iowa program. The Iowa laser program had been established earlier than the local program and apparently with more firm-specific components. Our interpretation is that because of the uncertainty surrounding hiring, a successful hiring pattern once established is unlikely to be changed.

[29] One production manager cited the quality of its preparation in electronics, but another mentioned that graduates were "professional," "courteous," and "good interviewees," with "concepts, foundations, but without a lot of hands-on experience"—suggesting that interviewing skills from "excellent career counseling" provided an edge. One employer said that the four-year degree was "really just a one-year extension from the A.A. degree," with its four-year graduates competing with individuals from two-year colleges, and another claimed that the firm hired "more ethnics"—African-American and Hispanic applicants—from this institution, suggesting it was used as a screen for affirmative action hiring.

[30] These were virtually the only two positive mentions of proprietary schools. Other references to proprietary schools by employers were generally negative, citing the short period of training and the lack of hands-on experience.

However, these are clearly exceptions; for most occupations, most employers, and most educational providers, the sub-baccalaureate labor market is a local phenomenon. The most obvious consequence is that shortages in specific occupations can persist because it is difficult for wage mechanisms to lure trained workers from other areas. For example, because of its agricultural base and relative dearth of manufacturing, Frankton lacks a substantial pool of production workers, including skilled machinists and repairmen; since it is difficult to induce such individuals to move from other areas[31] and the intermittent employment patterns in manufacturing provide little incentive for the development of local programs, the shortage persists.

Another consequence of exclusively local labor markets is more speculative. Within an economy in transition, changes take many forms: Some firms adopt new technologies and work organizations, as mentioned above; some occupations (e.g., electronics technicians and computer-related occupations) wax while others (agriculture and manufacturing positions) wane; and some regions and localities gain at the expense of others, as in the population shift from the Midwest and Northeast to the South and West, the continued mobility out of rural areas, and the rise of localities (Silicon Valley, the Research Triangle of North Carolina, and the area around Austin, Texas) associated with high technology (and, in earlier periods, localities associated with oil and gas and with the defense and aerospace industries). The transitions of an economy therefore involve spatial adjustments as well as occupational and sectoral changes. But within the sub-baccalaureate labor market, such spatial adjustments are slower because of the local nature of these markets: the local shortages and surpluses created as a result of national patterns persist longer than they would if there were more interregional mobility.[32]

The Dominance of Small Employers and "Small" Institutions

Another characteristic of the sub-baccalaureate labor market, described by both educational providers and most employers, is that initial employment is dominated by smaller firms. Individuals leaving community colleges and those trying to find new positions generally find employment in smaller firms at first. Then—because there can be relatively little mobility within small firms—the path of upward mobility requires them to move to larger firms with greater opportunities for on-the-job training, specialization, supervisory positions, higher earnings and benefits, and more stable employment.[33] In part, this pattern emerges because larger firms, with their better earnings and working conditions, are able to attract the most applicants and then—as the description of hiring procedures in the "Employers in the Sub-Baccalaureate Labor Market" section will clarify—are able to demand substantial experience from the individuals they hire. Small firms cannot be so selective, so they must hire individuals with less experience. As the director of placement for a well-regarded community college in the Palmdale area admitted,

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[31] While it is difficult to lure individuals from other areas because of the local nature of search in the sub-baccalaureate labor market, in the case of Frankton two other impediments exist: generally low wage levels, a consequence of the agricultural base, and the lack of amenities in Frankton.

[32] Our view of labor market adjusting slowly to disturbances is part of a larger analysis of how local labor markets adjust. For one effort to examine this issue, see Eberts and Stone (1992).

> I hate to say this but a lot of the smaller employers like to find students with us and can find students through us because their salaries are not as competitive as, say, IBM. And they know that we would have students who would be willing to get a job to get the experience at a lower salary.

In part, the apparent dominance of small firms in initial hiring comes from an imbalance between large and small firms. Large firms working under time constraints need to have workers who are immediately productive—"they want somebody who can come in and hit the bricks running"—while small firms under cost constraints are forced to hire inexperienced individuals and give them training: "Their problem is cash flow, so there, they may be more willing to take inexperienced people just to get somebody cheap."[34]

We did uncover other mobility patterns. In one, relatively small, high-tech firms "where scientific knowledge is part of the training base" hire individuals from larger firms. In part, this allows the smaller firms to use the training that larger firms can better afford. In addition, "Employment in larger firms is a sign of employability. It is a sign of competency. . . . Small firms look to larger firms to screen people for them."[35] In addition, some individuals get initial experience in the completely unskilled, routinized work of large firms. These examples suggest a revised conception of mobility in the sub-baccalaureate labor market: A hierarchy of more desirable and less desirable firms exists in which large firms are normally more desirable than small firms because they have better wages and benefits and more opportunities for advancement; but some smaller, advanced firms are still better places to work. Individual mobility, then, occurs both within firms (as we will see in the "Employers in the Sub-Baccalaureate Labor Market" section) but also via mobility up the hierarchy of firms. Individuals accumulate experience and perhaps some training in lower-level firms, and their employment in lower-level firms also signals "employability," "competency," and other personal traits so crucial in the sub-baccalaureate labor market.

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[33] This conclusion corroborates the statistical results in Grubb (1992b, forthcoming-b). In these results, higher earnings over time come from gaining access to occupations where individuals can accumulate more experience and on-the-job training, and the value of community college credentials is that they help individuals gain access to such positions. But experience and on-the-job training are absolutely crucial to earnings; once these are controlled, community college education provides no additional advantage.

[34] Perhaps inadvertently, this is the approach to providing general training envisioned by Gary Becker (1975) in which individuals pay for general training through reduced wages—in this case, the lower wages of smaller firms who are forced to provide on-the-job training and from which individuals move to better-paying larger firms.

[35] The individual who identified this pattern is a staff member of an industry association of high-tech manufacturers in the Palmdale area. After her initial interview, we expressed surprise about the pattern of smaller firms hiring from larger firms; she then checked with several small firms to confirm this pattern. In general, however, the quality of information about mobility patterns is poor since employers and educators have incomplete information; employees, whom we did not interview, have limited recall (see footnote 103). Our views about mobility should therefore be considered tentative.

There are several consequences to the dominance of smaller firms in entry into the sub-baccalaureate labor market. One is that hiring procedures are highly informal. Small firms lack personnel departments and formalized hiring criteria; they rarely articulate any specific requirement for hiring—a particular educational qualification, for example, other than the widespread requirement of a high school diploma—and instead use casual assessments of skill to make their choices. In addition, they hire too few individuals in any one occupation to develop well-established ties with particular providers of education such as local community colleges or to accumulate information about the strengths and weaknesses of various sources of potential workers.[36] On the demand side, then, there is relatively little information about the options available.

Another consequence of entering small firms is that individuals in the sub-baccalaureate labor market are more likely to be laid off over the business cycle, giving greater instability to employment than in larger firms. Those individuals who find themselves out of work during a downturn need retraining in order to enter other occupations, adding to the numbers in community colleges and other training programs and swelling the numbers needing retraining. In this way, the dominance of small firms contributes to the magnitude of retraining required in the sub-baccalaureate labor market.

The providers of education and training in the sub-baccalaureate market are also "small" in a somewhat different sense. Certainly some community colleges are quite large, as measured by their enrollments: A few enroll over 100,000 students per year, and several community colleges in our four areas enroll over 25,000. But these numbers are deceptive: Many students enroll for only a course or two, and many take remedial education, English as a Second Language (ESL), or avocational courses. Many students are using community colleges to transfer to four-year colleges, and others are "experimenters," unsure of their plans but using low-cost community colleges to explore various options. Even many occupationally oriented students take very few courses or drop out before completing a program (Grubb, 1989).

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[36] Indeed, our sample of firms interviewed is biased toward mid-sized and large firms precisely because interviewing very small employers about their hiring policies proved pointless.

The numbers of completers in any one occupational area in any one year are therefore quite small—more likely in the range of ten to twenty, even for an institution with an enrollment of 25,000. Furthermore, there are typically many potential providers within any community: In most places, there are several community colleges within a reasonable distance, with area vocational schools, perhaps some remaining high school programs, a few proprietary schools, and shorter-term job training programs (including those run by the local community college, as in Frankton) adding to the supply. The sense of the job-related education and training system being chaotic and fragmented was widespread among employers. A typical comment came from the director of an economic development program in Frankton:

> It sometimes feels like there are a million different training programs in the area. . . .I've been in this business for seven years, and I still can't tell you who they all are. Between the junior colleges, private nonprofits, CBOs, K through 12 school systems which also operate separate adult schools, and there seems to be two or three different tracks of vocational training, . . . it's hard to keep track of it. I think it would be difficult to plan what to train for when it's hard to develop a comprehensive view of what's out there. I can't keep track of them, and I have a vested interest in it.

With the exception of some firms that have established good working relations with specific educational programs, particularly those in Cotooli participating in co-op programs and employers in Rosefield relying on local electronics programs, many employers were unable to distinguish among providers; their responses to questions about the strengths and weaknesses of various educational institutions were vague and unreliable, and it became clear that these institutions do not have very clear reputations in the employer community.

The case of many small firms and many small providers of education and training may appear to match the textbook case of a market, in which there are many demanders and suppliers. However, in practice, small size thwarts the development of the information that is necessary for markets to operate efficiently. Each side is relatively uninformed about the other, and the small size of the institutions makes it difficult to accumulate information. In most cases there are no organizations whose business it is to provide information about this labor market—community college placement offices are weak, as we will examine in the next section, and local labor market information is quite imprecise.[37] The result, compared to the market for those with advanced degrees, appears to be a market where it is relatively difficult for individuals to find their way.

The Variation Among Local Labor Markets

Not surprisingly, there are substantial differences among the four labor markets we examined. Indeed, the purpose of examining four communities—rather than analyzing a single labor market in greater detail—was to identify the ways in which sub-baccalaureate labor markets, with their intense local focus, vary from place to place. While further research in still other communities would uncover other kinds of variation, the most obvious variations include the following:

- *Sophistication and pace of technical change*: Frankton, with its base in agriculture and agricultural processing, was the least technically advanced of the four communities. Indeed, educators there complained that computer-based programs in machining and drafting were ahead of many employers who had not yet moved to computerized systems; and it was more common in Frankton to hear of production facilities which retained very old equipment. As a result, there is less demand on educators for technically sophisticated programs. Conversely, individuals who want to pursue certain occupations have to move elsewhere. (Frankton is unsophisticated in other ways as well: As an isolated and rural community, it has few of the urban amenities of the three other communities we examined.) At the other extreme, the Palmdale area is home to some of the most sophisticated high-tech firms in the nation; and Cotooli has also modernized its industry dramatically (partly in response to foreign competition) and has a large number of factories with leading technology.

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[37] Every state has a state occupational information coordinating committee (SOICC) which publishes information about local employment, but this information generally describes the numbers hired in various occupations rather than providing the information about specific firms and particular hiring criteria that students entering the labor market require.

- *The influence of a dominant sector*: Many local labor markets are dominated by a particular sector. In Frankton, it is agriculture and agricultural processing; in Cotooli, the manufacture of machinery with increasing high-tech applications; in the Palmdale area, the development and manufacture of computers, computer-related equipment, and software; and in Rosefield, probably the most varied of the four, banking, insurance, and government employment—all dominated by white-collar occupations—are the largest sectors.

The dominant sectors determine what occupations are in short supply.[38] In Frankton, for example, the manufacturers who have moved in to take advantage of low costs complain about the shortage of machinists and repairmen: Since there has not been an extensive market for these occupations, there is not a pool of experienced workers in these occupations (even in a recession) while no such shortage exists in Cotooli. Similarly, individuals trained in modern electronics are harder to find in Cotooli than in Palmdale, where an employment boom in the 1970s and early 1980s generated a surplus of technicians. (Shortages seem to develop only in occupations where substantial technical training is necessary, however: No employers complained about shortages of secretaries, clerical workers, accountants, or other business occupations—except in the sense that independent and reliable individuals willing to work for low wages are always in short supply.)

Otherwise, however, the sectoral composition of local labor markets seems to make little difference (for a similar argument, see Grubb & McDonnell, 1991). One reason is simply that the occupations of sub-baccalaureate labor markets are quite common, with relatively large numbers in virtually any community (except the smallest): Every labor market has large numbers of secretaries, clerical workers, accountants, production technicians, nurses and health technicians, and the like. The problem that exists is at the baccalaureate level—where some markets are "thin" in the sense of having very few positions in specific occupations—and is much less serious in sub-baccalaureate labor markets.

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[38] Employers and educators speak of shortages without regard to wage rates; that is, they usually do not acknowledge that shortages could be eliminated by increasing wages but instead speak about shortages as being caused either by the preferences of potential workers—for example, avoiding machining because of its image as a dirty occupation—by the lack of education and training programs, or by the lack of experienced workers because of out-migration or sectoral patterns. Therefore, the dominant responses to perceptions of shortage are to recruit over a wider area and to induce education providers to create or expand programs, not to increase wages.

- *Idiosyncratic local problems*: Every community has some purely local issues that weigh heavily on employers and education providers. In Frankton, for example, the fact that it is a relatively unsophisticated community with few urban amenities, and few nearby attractions makes it difficult to lure employees into the area; skilled and ambitious individuals tend to leave for places with a better quality of life and more employment opportunities. In the Palmdale area, congestion and high housing prices have made life difficult and prevent firms from recruiting outside the area. Cotooli, with its manufacturing base, has been seriously affected by the nationwide decline in manufacturing that took place during the 1970s and 1980s. Such issues appear over and over in remarks from both educators and employers; but within a study based on a small number of case studies—that is, four local labor markets—there is no way to generalize about such effects.

- *Education and training providers*: Finally, there were substantial differences among our four communities in the ways the providers of education and training related to employers.[39] Relations were closest in Cotooli, largely because of a well-established co-op program. In addition, the state requires that programs with placements below seventy-five percent be reviewed for possible elimination, providing another incentive for close working relations. Many employers in Rosefield—particularly those hiring electronics technicians—have also established good working relations with particular community colleges. The reputations of several community colleges in the Palmdale area were also relatively good, though that does not mean employers hire from these institutions (as the "Employers in the Sub-Baccalaureate Labor Market" section will clarify). Finally, connections were weakest in Frankton, where a majority of employers we interviewed were critical of local education providers.

It is tempting to draw a link between the technological development within a community and the nature of the relations between educators and employers. In Frankton, which is relatively unsophisticated technically, there appears to be less concern with skill development and formal schooling—one individual remarked, "Frankton is not education-oriented"; and the majority of employers we interviewed were either indifferent to local education providers or openly critical of them. In Cotooli, with much more technically advanced firms, relations between education providers and employers are generally excellent. However, there are too many other factors to establish such a simple link, and the variation within communities and among occupations within the same community adds to the confusion. Establishing a causal relationship between a community's technological sophistication and the nature of relations between education and employment will require substantially more information than we currently have.

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[39] The variation in how educators and employers interact is almost certainly much greater than we were able to capture in four communities. For example, some communities are dominated by a single community college with an enormous local reputation, as described in Grubb and McDonnell (1991). In other areas, there are virtually no providers of postsecondary education and training; Indiana has only one community college, for example. Florida's requirement that vocational programs must have a seventy percent related placement rate may have changed these relationships, as may have the performance measures required by the Perkins Act.

There are, then, some clear differences among the four communities we examined. However, the commonalities in the sub-baccalaureate labor market across different communities are even more striking both among providers of education and training and among employers. These commonalities allow us to generalize about sub-baccalaureate labor markets rather than treating them as purely local and idiosyncratic.

THE PROVIDERS OF EDUCATION AND THEIR CONNECTIONS TO EMPLOYERS

The dominant providers of education and training in the sub-baccalaureate labor market are community colleges and technical institutes. There are, of course, other providers, though they figure much less prominently among employers. Short-term job training programs like JTPA and the JOBS program for welfare recipients train some individuals, particularly for clerical occupations, some computer-related positions, and sometimes craft work; but their programs are so short that they generally prepare individuals for the least-skilled positions, not for middle-skilled jobs.[40] Not surprisingly, then, none of the employers we interviewed in any of the four labor markets mentioned these job training programs as sources of potential employees. Similarly, proprietary schools did not loom especially large in these four areas. Employers generally had mixed feelings about these providers; several condemned them as charlatans, though a very few had established good working relations with specific proprietary schools. In Frankton, a particular area vocational school was widely known; and in the Cotooli area, the vocational high schools—which students attend full-time for two or three years, with half of each school day devoted to vocational courses—have substantial reputations; but aside from these cases, community colleges are the most prominent providers of education and training.

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[40] For example, a well-known community-based organization in Palmdale—probably one of the best providers of short-term job training—includes programs in electronics and in machining for JTPA and JOBS clients. However, the electronics programs prepare individuals for assembly-line positions assembling computer components; the machining program also places individuals in jobs paying so little—five to six dollars an hour—that they are are likely to be entry-level assembly line positions.

Community colleges are themselves quite varied institutions with some students attending in order to transfer, others needing remediation before they continue their education, some taking avocational courses, and with an undetermined number there as "experimenters" trying to determine whether postsecondary education might be appropriate for them (Manski, 1989), and some there for clearly occupational purposes. In the latter group, some students are relatively young and seeking to enter the labor market for the first time. A larger number are older and are enrolled either for retraining, particularly in cases where they have been laid off from a previous position, or for training to upgrade their skills. Most community colleges also provide contract education to specific firms, and most of that can also be considered upgrade training. While some community colleges ask entering students about their reasons for attending, the results are not necessarily reliable because so many students have unclear or shifting objectives or pursue a mix of courses. However, it is relatively clear that community colleges have become predominantly vocational institutions[41] even though the balance of purpose varies from institution to institution.

Even though the intentions of the majority of community college students are largely vocational, in practice they are often more remedial institutions, with even the courses appearing in vocational departments really serving the purpose of teaching very basic skills and information. Virtually every community college now offers remedial courses, with estimates of the fraction of community college students needing remediation ranging from twenty-five to fifty to seventy-eight percent in the Tennessee system (see the evidence summarized in Grubb, Kalman, Castellano, Brown, & Bradby, 1991, pp. 18-19). The dean of occupational education at Rosefield City College estimated that seventy percent of occupational students need remediation in basic skills, and—in response to employers claiming a greater need for basic skills—he developed a Tech Prep program of reading, writing, mathematics, computer familiarization, introduction to the world of work, and introduction to tools and materials for these students. As a response to the deficiencies of students and the demands of employers for adequate basic skills, such a response seems admirable; but it also clarifies the extent to which ostensibly occupational programs are mislabeled.

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[41] According to the NPSAS of 1990 (see footnote 3 on page 5 of this document), sixty percent of students in community colleges declared themselves to be vocational students. This proportion has declined slightly from the 1986-1987 survey when it was sixty-eight percent, possibly because of increases in remedial and ESL courses.

Another difficulty with characterizing community college students is that relatively few complete entire programs (Grubb, 1989) even though most community colleges and technical institutes are careful about structuring both certificate and associate degree programs with sequences of vocational courses and related academic coursework. Instead, the typical pattern is to accumulate several vocational courses, perhaps with some supporting academic (and potentially remedial) coursework (Grubb, 1989).[42] For employers as well as those trying to assess the effectiveness of community colleges the prevalence of noncompleters makes it difficult to know how much education a community college student has received.

Community colleges maintain connections to employers in many different ways, at least potentially providing a way for both the institutions and their students to get more information about employment opportunities. However, there is a great deal of variation in the way these connections operate, so in practice, some institutions do little to help their students make the transition into the labor market.

Advisory Committees

Every community college we interviewed maintains at least some advisory committees with local employers providing most of the members. In theory, such committees can provide information about skill requirements, hiring standards, trends in employment, and other similar information that would help colleges change the content of their programs and adjust enrollments as demand waxes and wanes. In practice, however, we found little evidence that these committees are very active. Several community colleges meet with them only annually; in other cases, employers who were members of such committees clarified how inactive they had been. Some advisory committees are institution-wide rather than occupation-specific and cannot, therefore, provide information about the skills requirements of hiring prospects in particular occupational areas. There is nothing to guarantee that advisory committees exist in all areas of the curriculum; for example, Rosefield City College, located in a city with considerable demand for office workers on the part of both financial institutions and government, had no advisory committee for its business division. The dean for occupational education reported,

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[42] Within community colleges, a convention has developed that students who appear to be "dropouts" have entered in order to fill in specific gaps in their preparation and have left college for employment as soon as their needs are met; those who appear to be "dropouts" are therefore completers. However, there is no empirical support for this assertion; if it were true, those with a few community college courses would have higher earnings than individuals with high school diplomas only—contrary to the empirical results. See results from the Survey of Income and Program Participation (SIPP) in Grubb (1992b). Kane and Rouse (1992) find somewhat greater benefits to community college enrollment for noncompleters, but their results reflect wage rates rather than annual earnings and are consistent with occupational programs that place individuals in jobs with high wage rates but intermittent employment.

> We're going less and less to the individual program advisory and more and more to the overall advisory group, technical advisory groups, strategic planning groups because we're finding out that the problems are universal.

The trend to institution-wide committees may be an excellent way to assure that current shibboleths about skill requirements—for example, the need for basic skills—are communicated to educators, but a much weaker device for maintaining contact with prospective employers in specific occupational areas.

Furthermore, there is a startling disjuncture between the colleges' perceptions of advisory committees and those of employers. While administrators and department heads referred to such committees as establishing strong links to local employers, the vast majority of employers, in all four areas we examined, were unaware of these committees. Where they were aware of the local community college—particularly in Cotooli with its co-op program and in the Palmdale area where several community colleges have high profiles because of their transfer programs—the reasons have little to do with advisory committees.

There is also some frustration among educators about these advisory committees since they do not always provide the right information. One community college dean complained about the value of "shiny pea luncheons":

> Often the folks that the businesses put up to be on the advisory committees are not the decisionmakers and they aren't even that well-informed about what the needs are in the industry. These people have time to go off to the college somewhere and eat shiny peas. So there is a lot of frustration all around about the working relationship and how to reconfigure it in a very different way.

Another reinforced the problem of conflicting information within firms:

> In the PIC [private industry council] groups, industry sends its personnel people, and they are not the ones who ultimately say yes or no. The people in manufacturing, research, sales, [and] administration have different criteria for hiring people than personnel does. It's hard for education to guess what is needed.

One community college researcher complained that many firms would not provide the right information:

> Many of the industries won't tell you what they will be doing because they are very, very secretive about what's next or what kind of people they'll need next. PIC meetings don't even bring out this information. Business won't say what it will be needing or what they are developing. We sort of have to stick our finger in our mouth, hold it up, and see which way the wind is going. There is opportunity for biological technicians, but the demand isn't there yet; so [my college] won't prepare for it. Industry won't tell education where it will go, so it makes it difficult.

In addition, the timing of information is clearly a problem; a personnel manager of a high-tech firm in Palmdale admitted that "long range for us is probably six months" and admitted that most "planning" is concerned with a period three months in the future. Numerous employers complained about the slow place of educational institutions, as we will clarify later, but it is also possible that employers are just as much to blame because of their inability (or unwillingness) to forecast employment needs.

Community colleges make the greatest use of their advisory committees in deciding whether to establish new programs. Typically, colleges will respond to requests for a new program by convening a committee of potential employers and asking them about occupational trends and the content of a possible program. For example, the short-term training center of Frankton Community College established a general repair program after complaints from local manufacturers that they were unable to find well-rounded repairmen; that program appears to have high placement rates. However, even in these cases, the information colleges receive from their advisory committees is uncertain. Necessarily, colleges ask whether there will be employment opportunities in an occupational area, not whether local employers will hire graduates (or even noncompleters) of community college programs—a more precise but more difficult question, especially given the uncertainties of small employers and of firms operating in the sub-baccalaureate labor market. Given the overwhelming evidence (presented in the next section) that employers in the sub-baccalaureate labor market prefer to hire individuals with specific experience rather than those with formal schooling only, we suspect that advisory committees are giving colleges overly general information about employment opportunities.[43]

Placement Offices

Virtually every community college operates a placement office, and this too provides a potential source of information for students and an additional connection to employers. However, most placement offices are woefully understaffed, with most institutions having at most two or three individuals (or several work-study students) for colleges enrolling up to 25,000 students. Moreover, most placement efforts concentrate not on employment of students leaving the institution but on part-time work for students to support themselves during their education—"stay-in-school type jobs," as one placement director called them. Similarly, a number of employers mentioned that they would post notices of temporary jobs at community college placement offices—"specifically targeting college students for whom these temporary, part-time, or evening jobs would be convenient"—but distinguished such jobs from regular, full-time positions for which they recruited in different ways. As a result, the quality of jobs available through placement offices is low; many jobs posted appeared to be barely above minimum wage in fast-food restaurants and other unskilled occupations. More to the point, most jobs handled by placement offices are unconnected to the occupational programs of the college itself.[44]

Some employers routinely send notices of job vacancies to local community colleges as part of their general publicity, but even here, employers and placement officials report some discouraging experiences. Several employers reported contacting local community colleges about job vacancies and meeting with little enthusiasm and no action except the posting of notices—that is, no efforts to refer well-qualified students. Of course, these incidents might reflect idiosyncratic incompetence or rare failures in what are otherwise smoothly-functioning placement offices.[45] However, a more likely interpretation is that a placement office which considers itself as helping continuing students find part-time work is simply unprepared to execute the screening function that these employers requested. In still another kind of breakdown, a new director of a placement office reported consistent failure in trying to institutionalize connections to vocational departments so that the office could refer appropriate students to employers when they called for referrals. In this case, vocational departments were simply unconcerned with placement—in fact, a rational response for any department and institution that is enrollment-driven and whose enrollments are adequate. Many educators stressed that students are responsible for their own placement—a confirmation of the oft-mentioned declaration that community colleges are "educational institutions, not placement bureaus."[46]

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[43] Of course, it is also possible that employers on advisory committees misstate even general trends since it is always in their interest to have as large a pool of applicants for particular occupations as possible, both to be able to choose on the basis of behavioral traits (e.g., motivation) and to drive down wages. However, we suspect that deliberate misstatements are less a problem than the difficulty in responding to counter-factual questions of the form, "Are you likely to hire more electronics technicians within the next two years?"

[44] On the tendency for the various parts of the community college to be independent from each other, even those with related concerns, see the comments on the community college as an archipelago of disconnected islands in Grubb and Kraskouskas (1992).

In addition, there is an imbalance between the interests of placement offices and those of employers that might limit the effectiveness of this matching function. As the manager of a machine shop for a very large employer in Cotooli described,

> When we hire for the apprenticeship program, we try to stay away from [community college] people who counsel because their objective is to place people and our objective is to be very careful about selecting people who will be successful in this environment. We believe that we've got a better skill at it, at interviewing and evaluating applicants for our particular needs.

Were placement offices to make more strenuous efforts to link students with employers, they would be placed in a difficult dilemma: To stay credible with employers, they would have to recommend only the most capable students; but by construction, that would make them ineffective in placing weak students. The only solution to this dilemma is to have all students be capable—but in nonselective and noncoercive institutions like community colleges and in employment situations where many dimensions of ability (like motivation and persistence) are beyond the capacity of community colleges to affect, this becomes difficult to achieve.

There are some exceptions to the weakness of placement efforts. In Cotooli, placement offices are better staffed and we heard many more favorable reports from employers about placement offices. This may be partly a result of state policy that requires programs with less than seventy-five percent placement be considered for closure; and since the placement offices conduct the follow-up surveys necessary for this determination, departments are in a sense beholden to placements offices. The co-op programs in Cotooli also seem to have more strenuous placement efforts partly because of the desire of educational providers to establish co-op programs and to find co-op placements for their students. In another example, the short-term job training center of Frankton Community College has a placement office that includes several "job developers"—individuals responsible for maintaining regular contact with employers who might hire the program's completers and active in "developing" job opportunities rather than waiting for employers to request students. However, this program is funded partly though JTPA and JOBS, with their greater emphasis on placement. These exceptions have developed in conditions where there are incentives to increase placement. Otherwise, the placement efforts of community colleges are uncertain ways of strengthening connections to employers.

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[45] One problem in working with employers is that they appear to be unforgiving, so an idiosyncratic error can have permanent consequences. In the case of the Frankton manufacturer, one poor experience with the community college colored his entire perception of the institution.

[46] For other examples of this view, particularly in contrast to the greater efforts within JTPA and the JOBS program to fund placement efforts, see the report on cooperation among postsecondary vocational programs, JTPA, and JOBS in Grubb, Brown, Kaufman, and Lederer (1990).

Placement by Occupational Instructors

A different way to carry out placement is to give occupational instructors the responsibility for placing students. This has the potential advantage of having individuals who are the most knowledgeable about the particular program and students conduct placement and of ensuring that information from employers gets back to those who teach in occupational programs. In some cases, it is clear that this kind of placement does happen: At the area vocational schools in Cotooli instructors are supposed to do placement, and several other instructors gave numerous examples of the ways they place students with former employers and other community contacts.

However, the majority of instructors seem to do little placement. For example, one community college placement director estimated that only five to ten percent did any placement, largely part-time faculty "working out in the field that have connections." Another commented on "the line" dividing placement from instructors[47] and went on to blame workloads: "People are just overwhelmed, and something like placement is sort of way in the background."

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[47] The same individual acknowledged that the problem of internal divisions within community colleges was more extensive than its manifestation in placement and that counselors and instructors are similarly divided. This is part of the larger problem of the community college as an "archipelago" of disconnected activities described in Grubb and Kraskouskas (1992).

Even when instructors claim to be a source of employment, their methods of placing students sound haphazard and they often acknowledged that they place relatively few. For example, a computer instructor in the Rosefield area said,

> Because of the fact that we're out in the community, we'll mention positions that we see. And I go to a very large church, and I have a lot of friends who are in the computer field, and . . . yeah, we act as a conduit.

But he also admitted that he placed only three or four students a year—"not a great number." In addition, responses to questions about local employers were often vague.[48] Several admitted to virtual ignorance about employment opportunities. One accounting instructor in a well-regarded Palmdale community college admitted,

> I don't know how firms perceive an accounting degree from [my institution]. People know that a year or two of accounting classes will only get you so far. A community college is a community college, I believe.

Some instructors think that placement is not their responsibility (as do many educational institutions as a whole); some, not surprisingly, come from outside the area and are unfamiliar with local employers, while others have so little experience in industry that it is unreasonable to expect them to be knowledgeable about the local labor market.

A different kind of structural problem impedes the ability of some instructors to be active in placement—one that is similar to the problem affecting placement offices. Successful placement requires differentiating students, recommending only the best and most motivated; but the best teaching requires that instructors *not* differentiate among students, that they devote as much (or more) time to weak students as to the strongest, that they concentrate on the strengths of students rather than on their weaknesses. Since the teaching role and the screening role are antithetical, some instructors are reluctant to do more than provide information to students. As one drafting instructor described his placement efforts:

> In one of the advanced drafting classes, we have a job board, and . . . I hate picking. That's the first thing the business people want—"Hey, pick me somebody. Who have you got who's good?" And I don't like doing that. So [students] pretty much know, since they're older, they know when

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[48] See Questions 25 and 31-33 in the questionnaire for education providers in Appendix A.

> they're ready. And so any time there's a job, I'll say, "Hey, here's the data"—name, rank, serial number, type of job, salary range, etc. And then we'll put it up on the board.

As a matter of principle, however, he refuses to engage in "picking."

In general, relying on occupational instructors to provide placement would require a consistency of interest and effort and of experience and knowledge about local employment that would be difficult for community colleges to ensure[49]; placement is simply not part of the job description for community college instructors. The result is that this approach to placement results in only idiosyncratic success.

Student Follow-Up and Tracking

Yet another mechanism of generating information about the labor market is to follow students as they leave the institution and to collect evidence about their employment and earnings over time. While this does not provide information about specific employers, it does allow instructors and institutions to analyze the patterns of employment among students—whether students in specific occupational areas find employment related to their field of study, whether their employment is stable rather than intermittent, what wage rates they earn, whether they advance over time or not—in ways that are useful to students trying to decide what occupations to enter and to institutions trying to identify weak programs.

However, student tracking systems are not well-developed in most community colleges across the country. A few states like Florida, Minnesota, and Ohio have developed tracking systems relying on telephone surveys of former students; Florida requires vocational programs to maintain a seventy percent related placement rate; and Ohio reviews programs whose placement falls below seventy-five percent. California has funded a pilot project to follow up vocational students, but response rates are typically in the range of ten to twenty-five percent, making the results highly suspect; the studies have been carried out only in a sample of community colleges and only erratically, every three years or so; and while there is general awareness that such follow-ups exist, no instructors or administrators were able to recall the results from any study. Methods of tracking students that rely on unemployment insurance records rather than questionnaires to former students are now being tested in a number of states, but this approach is still in its early stages (see Baj, Trott, & Stevens, 1991; on approaches to student follow-up, see Palmer, 1990). The result is that there is no usable information about the subsequent employment of occupational students or the success of particular programs. An accounting instructor at Rosefield City College—an individual who admitted that community college certificates and associate degrees are "almost useless in private industry" because of their hiring B.A.s—mused, "You know, I've often wondered what happens to two-year students," admitting that most of the students he knew personally had transferred to four-year colleges to earn B.A.s in accounting.

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[49] This problem is no different in community colleges than it is in other educational institutions. The attempt to place the responsibility for related services on instructors—whether placement or counseling or outreach to parents—has never worked well at any level of the educational system, so it has always been easier to establish independent offices (like placement offices and counseling centers) instead.

It is likely that student follow-up systems will improve in the future. The 1990 Amendments to the Perkins Act require states to develop performance measures for their secondary and postsecondary institutions receiving federal funds. Most states have adopted some measure of placement for their postsecondary institutions (Hoachlander & Rahn, 1992). While there is no requirement to implement these systems of performance measures or to impose sanctions on low-performing programs, most observers feel that improved student tracking systems are likely to emerge in most states from this federal impetus. One result would be to provide better information to students about the employment consequences of the various programs they could enter and to alert institutions to programs which have low rates of placing students in related employment—information which is now almost completely missing.

Contract Education

Virtually every community college now offers contract education—typically, short-term programs ranging from a couple of hours to several days—for employees of specific companies that pay a substantial share of the cost.[50] Because individuals being taught in contract education are already employed, the education is almost always upgrade training rather than initial education or retraining; typical subjects include new computer applications (e.g., word processing and spreadsheets), TQM, statistical process control, communications skills, and human relationships. Remedial English, remedial math, and ESL are also frequently taught, particularly when employers find these skills are necessary for upgrade training or for work reorganization involving communications skills.

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[50] In the survey conducted by Lynch, Palmer, and Grubb (1991), ninety-four percent of community colleges reported providing some form of contract education. Employer funds averaged forty-two percent of total funds supporting contract education. For other evidence that contract education has expanded at the sub-baccalaureate level, see Bowers and Swain (1992): Based on CPS data from 1983 and 1991, the fraction of individuals with "some college" who received formal on-the-job training increased from 15.1% to 20.4%.

Potentially, contract education provides another kind of contact with employers both in the sense that it allows employers to see the offerings of a particular college and that it enables administrators and instructors to see what skills are required in employment. Indeed, this contact may be more useful than that provided by advisory committees because it requires employers and educational providers to collaborate on a specific task. Contract education also requires employers to be specific about the skills they require and to back their requests with funding rather than to provide advice about probable trends in employment which may not be accurate. On their part, educational institutions become responsible for providing precisely what employers request, not what students enroll in or what their faculty wants to teach. Several community college deans mentioned contract education as a model for relationships with employers that ought to replace the advisory committee approach. Indeed, several community colleges who boasted about their connections to employers referred to their contract education programs (not their regular vocational programs), and contract education is the major contact between providers and employers in the Palmdale and Rosefield areas.

However, the potential for contract education to strengthen the communication between employers and education providers is unrealized in most community colleges. While contract education may sometimes employ regular occupational faculty and use "off the shelf" some of the courses normally provided by the college, contract education in the institutions we examined tends to be established as an independent office with its own distinct offerings. Instructors are often drawn from the large pool of free-lance "consultants" that exist in most cities, with few connections to the regular occupational programs.[51] As a result the opportunity for contract education to convey information to employers about the regular offerings of a community college and to occupational programs about the skill requirements of employers is lost.

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[51] For corroboration of the independence of contract education from the rest of the vocational program, see also Lynch et al. (1991). Our understanding of the development of contract education is that in many institutions, vocational education departments have always provided some contract education; but with the inevitable variation from department to department in the intensity of these efforts, community colleges have moved to centralize contract education in independent offices that are more "business-oriented"—more entrepreneurial and aggressive and more focused on the needs of business—rather than "education-oriented," emphasizing the needs of students. The establishment of an independent office may promote contract

Work Experience and Co-Op Programs

A different form of connection to employers comes in work experience and cooperative programs, which combine formal schooling with on-the-job experience; apprenticeship programs, sometimes operated through community colleges or area vocational schools, often accomplish the same combination of classroom-based and work-based learning. Often, work experience and co-op programs have made no effort to ensure that the on-the-job component has any educational value or is connected to the classroom instruction, so work experience programs have often been criticized as little more than release time for low-skilled work. When appropriately constructed, however, work experience programs can provide a different and complementary approach to learning. In addition, they can promote connections between education providers and employers through the process of establishing cooperative programs, of determining appropriate employment, and of formulating the right balance of classroom instruction and on-the-job learning, which requires extensive coordination between the two.

Despite the possible advantages of work experience programs, very few educational providers in three of our four areas have established them.[52] The notable exception is the Cotooli area, where well-established co-op programs exist in all the secondary area vocational schools, the two-year technical institutes, and four-year colleges. Co-op programs in that area—sometimes described as "the birthplace of co-ops"—started around 1906 with a partnership between the local university and a prominent manufacturer of milling machines. They have since spread informally without much organized structure. Virtually all employers we interviewed have had some experience with co-op programs, and almost all report them to be excellent.[53] Even those that have not adopted co-op

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education more strongly and give it greater prominence in the business community, but it also isolates it from the offerings of the regular vocational program.

[52] In Rosefield, Palmdale, and Frankton, we uncovered only one co-op program, operated by a local Air Force base near Rosefield for machinists and electronics technicians. Those responsible for this program describe its advantages in terms similar to those of the Cotooli co-ops.

[53] Of the thirty-five different employers we interviewed in the Cotooli area, only one was dissatisfied with the co-op programs and had terminated its participation.

programs have nonetheless heard extensively about them; as the personnel director of one valve manufacturer—a firm that had not developed a co-op program—reported,

> One thing I've heard from other people is that the schools that have some type of internship or co-op program, whether the school requires it or the students are free to elect it, that seems to make a big difference in how well they do [on the job]. Part of that has to do with just getting out and seeing what it's like to work.

Because of the lack of standardization, co-op programs in Cotooli vary among firms and educational providers. However, it is common for students to alternate semesters at work and school.[54] Often, students are paired so that when one co-op student leaves the job for a semester of schooling, his or her counterpart begins a co-op semester; in this way, employers have a continuous employee and educational enrollments are also stable. Many firms have tuition reimbursement programs for their co-op students; in addition, some provide equipment and materials to the co-op program.

Some co-op programs have minimum GPA requirements for entry, clarifying that they are in part screening mechanisms. More importantly, students whose job performance or schooling performance is substandard are dropped from the program. In one large program, for example, students have to pay for the schooling component themselves if they go on probation and are dropped if they fail courses, providing both fiscal and employment incentives to keep their grades up. Completing a co-op program successfully does not guarantee a job[55] since that depends on the number of vacancies that develop in particular occupations and varies with the business cycle as well as retirements and turnover.[56] However, firms involved with co-op programs often hire only co-op students for their entry-level positions, so these programs are the only ways into certain jobs.

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[54] In one of these institutions, for example, semesters are ten weeks long and the school operates throughout the year rather than on a standard academic calendar. Over a two-year program, then, an individual will have five semesters of coursework and five semesters of co-op placement. The Rosefield co-op program has another option called the "parallel program" in which students work a half day and attend school a half day. This has the advantage of not interrupting employment for a semester.

[55] One community college claimed one hundred percent placement from a particular co-op program, but other institutions were careful to note that they could not guarantee jobs because so much about placement depends on the state of the economy, the random timing of job openings, the personal qualities of students, and other factors beyond their control.

[56] For example, one firm reports hiring only twenty-five percent of their co-ops during the current recession, compared to over fifty percent in normal times; another reported eighty-five to ninety percent hiring in good times, compared to fifty percent now.

Well-run co-op programs provide both formal classroom education and specific, hands-on experience and allow students to see the application of classroom instruction. Given the importance of experience to hiring (documented at greater length in the next section), the specific experience co-op students acquire is critical to their being hired. In addition, the co-op program itself is a screening mechanism, allowing the firm to observe the individual working and to learn about the personal capacities—motivation, diligence, interpersonal skills, and the like—that are so crucial to employment. In the following, a personnel manager for a prominent machine-tool company in Cotooli described the advantage to both the student and the firm:

> One thing that [the local technical college] is doing is to force everybody through an apprenticeship program or an intern program. That's exactly the reason that they have at least some experience and they know the application of what they're learning. . . . Once they graduate, we have a tendency to hire those people. So then, when they're competing [with other applicants], they're competing with other people who have two-year or college degrees, but they have some hands-on experience in the company; we know them and they know us. . . . And at least half of [my company's] motivation [for participating in the co-op program] is to have these people whom we've been able to watch, we've been able to train—and upon their graduation we've got full-time employees.

From the students' vantage, a co-op placement is a screening mechanism in another sense: It allows an individual to see whether an occupation is suitable. "They haven't spent five years in engineering school to wake up one day to find out they don't like the work." In addition, some co-ops try to place students in a variety of positions so they can get a broad overview of the jobs available in a firm.

A rather different advantage of co-op programs is that they generate sustained contact between employers and educational institutions. In most cases, employers initiate the process and establish the terms of the co-op programs. The director of co-op programs for a medium-sized machine manufacturer of about five hundred employers described the process:

> Before we have a co-op program, we have to define the need for what our potential employee growth is going to be. And once we determine that, then we determine what kind of person do we want and ultimately what kind of position would they have. And then we contact five, six, seven, or eight schools and we narrow our choices down to three, we make a campus visit, talk to their instructors, we interview their students, we audit a class, we examine their curriculum, and then we invite them here to do the same with us. We share our mission statement, the future direction of the company, and then we select one school. For instance, we use the University of

> Cotooli for electrical engineering for their four-year degree program, but we also use Cotooli Technical College for their mechanical engineering but not the University of Cotooli. So it depends on what the curriculum is, what is the kind of education they get, theory versus practical or hands-on.

In fact, this firm had co-op programs with eight different educational institutions, including high schools and two- and four-year colleges. The partnership with these institutions is developed in other ways as well:

> We recently had a partnership day with a technical college, and the heads of the departments and the placement officers and some of the teacher came to [the firm] for a couple of hours and we had a tour of the company and then we had a brainstorming session on how we can help one another. And we provide tours for classes at these schools, plus we also provide guest speakers. We send our engineers and our machinists over to do a class if they want them to. And then also where the schools are recruiting at the high school level, we send one of our managers and one of our employees that used to be a co-op, and they do high school recruiting with the colleges as well. So we don't take a co-op from college and say we're going to give them a job. We develop the whole partnership aspect. We don't just take their people; it's how can we help you develop your students as well.

In addition, the students in co-op placements provide another source of information about employment. As the director of contract education in Cotooli Technical College described it,

> The co-op program forces us to have closer ties with business. . . . Students will bring back information to class about the ways in which they do a procedure that's very different than the way it's being taught. If we think that it's better, we'll change the curriculum.

The educational institutions with co-op programs also have more active placement efforts than do the community colleges in the other three communities we examined. As one personnel director reported,

> If I need a co-op [student] in anything, I can call [the local technical college] and within a half hour they will have begun faxing some backgrounds.

Finally, the co-op programs generate incentives for both education providers and employers to improve the quality of their education and their jobs, respectively, otherwise students will not enroll and employers will not provide jobs. A co-op administrator described the incentives for employers to offer decent jobs:

> I inform [employers] if they have a low campus image and nobody wants to interview with their company—because students bring this back, too, you

> know. There's nothing that can kill a program quicker than students coming back and complaining about their co-op job, so the students really talk to one another about these things—how much they make, what they're doing, and so forth. I mean, there's a lot of buzz on campus about different businesses and where the "good" jobs are. So employers need to know that.

At the same time, the educational institutions have to be sure to send students appropriate for the kind of work involved rather than "clunkers":

> If [employers] got clunkers every time, if they got somebody who couldn't do the job or learn the job—they would, of course, generally be able to deal with that on a once a year basis [but they wouldn't put up with it often]. If a coordinator doesn't screen an applicant sufficiently for the job—I mean, if you put a student out on a job, for example, in drafting or in CAD, and the student hates offices and wants to be in a factory or outside—that is not [going to work well]. So there's a certain amount of common sense to make sure that the situation works right.

These co-op programs therefore screen both students and jobs so that able students are matched with promising jobs and so both students and employers have sufficient information and there is an appropriate match.[57]

The consequence of the co-op programs in Cotooli is that the distance between education providers and employers, so notable in other regions, has been effectively overcome: Employers spoke knowledgeably and positively about specific educational institutions, routinely hired students from the co-op program, and displayed none of the indifference to the educational system that we found in other areas.

Sensitivity to Enrollment and Student Demand

A final way in which educational institutions can be responsive to employers and the local labor market is through their sensitivity to enrollment patterns. Community college administrators are quite knowledgeable about the revenues and costs associated with various types of classes and about the enrollments necessary for a class to break even—to generate as much revenue from tuition and state aid as it costs in instructor time and materials. As a manager from the high-tech industry in Palmdale who serves on an advisory committee to a local community college commented,

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[57] Of course, it is also possible for a "low quality equilibrium" to develop where the least able students are matched with the worst kinds of jobs; this has happened, for example, with the Cotooli Employment Service, and some work experience programs are also reputed to follow this pattern. An interesting question is how co-op programs in Cotooli have managed to establish "high-quality equilibria."

> Each class is considered a profit and loss center. Each class, not the program, not the college, not the campus, not the district—each class lives and dies on a profit basis.

As a result, community colleges tend to eliminate classes whose enrollments fall below the break-even level and even eliminate entire programs. For example, Frankton Community College had eliminated a number of their machining classes and a program in the area of numerically controlled machining, and several community colleges in the Palmdale area had eliminated their electronics programs when the recession eliminated jobs and student demand for this subject evaporated. Certain vocational programs—particularly those that are capital intensive such as programs in machining and electronics or health programs—are especially susceptible to being curtailed because their costs per students are so high. A "rational" community college trying to maximize net revenue will therefore eliminate expensive, low-enrollment technical courses and expand low-cost, high-demand classes in subjects like ESL.

Conversely, community colleges can expand classes when demand increases, and through their advisory committees, they generally have a mechanism for developing new programs in emerging occupations. As long as student demand for classes in particular occupations is sensitive to employment, postsecondary providers will be reasonably responsive to labor market conditions.

However, these incentives do not necessarily work smoothly. Since community colleges and area vocational schools are funded according to enrollments, they are enrollment-driven and sensitive to student demand, but they are not generally outcome oriented. They typically lack information about the subsequent placements of their students, as we have mentioned, and there are no financial disincentives from enrolling students who then fail to find related employment.[58] Therefore, student behavior rather than employer demand is the linchpin in this adjustment process and—except perhaps in extreme cases such as the decline in high-tech employment in the Palmdale area—students are not necessarily well-informed about employment conditions.[59] The sources of information about local labor market conditions are weak; students seeking initial training and retraining have little information about the occupations they are seeking to enter (as distinct from those needing upgrade training who have experience in the occupation); and the students we have labeled "experimenters" by definition know little about the alternatives they face. There is so little information about the placement and earnings of community college students that it is hard to know how they can make fully rational choices among the institutions and programs they face. It is difficult to be confident that student behavior is a suitable mechanism for bringing demand for occupations into line with supply.

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[58] Florida is one exception to the lack of incentives tied to outcomes. In that state, programs which fail to place seventy percent of their completers in training-related employment face elimination, and there seems to be a greater consciousness about employment effects. Two of the eight communities studied in Grubb and McDonnell (1991) are in Florida. Ohio also requires programs with placement below seventy-five percent to be reviewed for possible elimination.

Furthermore, student enrollments are also subject to manipulation by educational institutions. The rise of "marketing" during the 1980s at all levels of postsecondary education began to apply the principles of advertising to public and private education: Students might be persuaded to "consume" what they otherwise might not want or need. Institutions facing enrollment shortages therefore began to stimulate demand by advertising and outreach. One community college department head mentioned that "students don't know we're here," a preface to describing her informational campaign to attract more students.

Conversely, because they are enrollment-driven, community colleges do not maintain programs in areas where students fail to enroll despite substantial demand from employers or—a special problem in the case of machining and electronics programs as well as in many health programs—where costs are high relative to the state reimbursements and tuition students generate. In Cotooli in particular, employers complained about community colleges and technical institutes reducing their high-cost machining and electronics programs despite demand for graduates. In Frankton, the personnel director of a hospital complained about the priority of the local community college as being similarly finance-driven: "It's cheaper to educate unemployed liberal arts majors than it is to train nurses." (In this particular case, local hospitals came up with their own "private" solution to the problem by financing an additional instructor in the local community college program, in effect offsetting the high costs of the nursing program.) Of course, an important part of these shortages is the low entry-level wages and the unstable employment for machinists and technicians and the relatively low wages and dreadful working conditions of nurses. But the point remains that the institutional incentives to maintain education and training programs are linked to state reimbursement levels and costs and not to placements or labor market demand.[60]

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[59] While we have little direct information about student knowledge of local labor markets, it seems likely that their knowledge is imprecise. For some older research on the extent of student knowledge about employment, see Parnes and Kohen (1975). This study found that knowledge about the world of work was highly correlated with general academic ability. Given that community college students generally come from the middle rather than the top of the distributions of ability and high school achievement, it seems likely that their knowledge about employment conditions is less sophisticated than that of students completing baccalaureate degrees. Some indirect information about student motives comes from enrollment studies like those of Betts and McFarland (1992) and Grubb (1988), which indicate that enrollments in two-year colleges are more sensitive to costs than to benefits—that is, the employment consequences.

Furthermore, the response times of community colleges are often slow. A manager of new products in a high-tech firm, an individual who served on the advisory committee of a well-regarded community college in the Palmdale area, commented,

> My fear is that the bureaucracy of colleges is so humungous that the lag time between new technology and the implementation of courses about that new technology is vastly delayed by three, four years in cases. And likewise the other thing occurs: When a technology is obsolete or no longer useful in industry, colleges continue to teach it for many years. . . .Thus you would graduate without having any potential for getting a job in that discipline. Eventually it does get killed, but it takes many many years because the bureaucracy is slow to respond to the changing conditions. So it's bad in the beginning and it's sort of bad in the end, but in the middle it's pretty good.

Others complained about the lag in eliminating obsolete skills. For example, shorthand is still taught in many secretarial programs though it is rarely used; a personnel manager in Cotooli who had served on an advisory committee to the local community college described how her suggestion to eliminate shorthand had been rebuffed and then sighed, "We'll catch up sooner or later."

It is possible that the loose link between educational institutions and labor markets conditions may change under the pressure of performance measures currently being developed under the 1990 Amendments to the Perkins Act. Indeed, employers in Cotooli came to the idea of measuring performance and then making funding contingent upon performance on their own after discussing the problems with programs closing because of enrollment-driven funding:

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[60] This is the source of potentially substantial inefficiency. In economic terms, education and training are worth providing when the total marginal benefits—to those educated, to employers, to coworkers, and to consumers in the form of lower prices—outweigh the marginal costs. But community colleges provide education slots when the marginal revenue—state reimbursements plus tuition—outweigh the marginal costs. Since there is no relationship between the marginal benefits to society and the marginal revenues to the community college, education providers systematically over- and underprovide various types of education.

Employer 1: Wouldn't it be interesting if you could fund colleges based on the types of jobs the graduates get and how successful they are in their careers—rather than just funding them based on enrollment?

Employer 2: Pay for performance.

Employer 1: Yeah. How about that—pay for performance! What a novel idea!

As funding mechanisms are currently structured, however, there is every reason to be skeptical about the responsiveness of educational providers to labor market conditions.

Regulated Occupations and the Role of Licensing Requirements

There is one powerful exception to our general observation about the independence of education providers from employers. In the health sector, occupations are subject to public regulation through state licensing requirements. These requirements specify the educational requirements for particular health occupations, including the duration of programs, the skills that must be taught, and the related academic content that must be included. Such requirements are binding on both employers and educational providers since employers must hire licensed health care workers and providers must meet licensing requirements if their students are ever to get jobs. The licensing requirements therefore structure a congruence between the expectations of employers and the programs in community colleges. In turn, this may explain why the economic benefits of certificates and associate degrees in health occupations are larger than in other occupational areas (Grubb, 1992b).

Furthermore, the process of establishing and implementing licensing requirements puts employers and providers in constant contact.[61] Typically, the committees and task forces in charge of establishing licensing requirements are composed of both employers and providers. The enforcement of licensing requirements is also carried out by accrediting committees, again with both employers and providers represented; the scrutiny of each educational program therefore takes place by a committee of both peers and employers.

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[61] See especially Hudis et al. (1992), who describe health occupations in the San Francisco Bay area based on interviews with employers and education providers.

The amount of regular contact between providers and employers around issues that matter greatly is therefore substantial.

The contrast between these *organized* occupations in which required skills have been carefully codified by committees of employers and providers and markets in business occupations or computer-related occupations or many of the crafts where required skills vary substantially and are not codified at all is striking. In the *unorganized* labor markets more typical of sub-baccalaureate occupations, there is much more variation in the skills required among different types of jobs that are identically labeled and much less consistency in what employers expect from their employees and what educational institutions provide. The amount of sustained contact between providers and employers is much less—except perhaps in well-constructed co-op programs—and there is no necessity to reach agreement about something like licensing requirements that are binding on all parties. In contrast to health occupations, where the occupations and their requirements are well-known and the educational programs necessary to enter occupations are unambiguous, students are on their own with little guidance about job prospects and the best ways of qualifying for them.

There are not many examples of organized occupations in the sub-baccalaureate labor market aside from health occupations. A few other occupations are licensed—for example, cosmetologists—though such requirements now vary from state to state and some industry groups have tried to establish skill requirements and certificate programs, for example, in the areas of auto repair and inventory control. These are exceptions, however, and are still sporadic and voluntary; they have clearly not affected the majority of occupations in the sub-baccalaureate labor market nor the majority of community college programs. However, the current interest in establishing skill standards (Commission on the Skills of the American Workforce, 1990; Secretary's Commission on Achieving Necessary Skills [SCANS], 1991), following the model of Germany, is a potential harbinger of changes in this area.

We conclude, then, that while many mechanisms link community colleges and area vocational schools to employers in the sub-baccalaureate labor market, most of them work imperfectly.[62] To be sure, specific programs and individual instructors maintain strong ties to employers; the co-op programs in Cotooli link providers and employers quite well; and in health occupations, licensing requirements and the codification of skills establish close working relations between employers and providers. But institutionally, most educational providers are relatively distant from employers; they have little knowledge of specific employers, job opportunities, hiring requirements, promotion opportunities in various occupations and with various employers, and other aspects of local employment that are crucial to their students and to the content of their programs. They know almost nothing about where their students are placed and rely on hearsay and anecdote rather than direct evidence. Above all, the incentives for educational institutions to be responsive to employers are lacking since they are enrollment-driven and not outcome-oriented. The most distinct image we are left with is one in which two independent worlds coexist: the world of educational providers—enrollment-driven but relatively disconnected from employers—and the world of employers who (as we will see in the next section) are often unfamiliar with educational providers and indifferent to their activities.

EMPLOYERS IN SUB-BACCALAUREATE LABOR MARKETS: SKILLS, HIRING STANDARDS, AND PROMOTION

While it is daunting to confront the variety of education and training providers within a specific labor market, the number and variety of employers is even greater. Even in a small city like Frankton, the Chamber of Commerce lists 260 employers with more than one hundred employees, obviously excluding many smaller establishments. A more complex region like Rosefield, with its sprawl over a thirty-mile region, is even more varied. Fortunately, distinct patterns emerged from this variety; otherwise, it would be impossible to describe the demand side of the sub-baccalaureate labor market. Where there was no distinct pattern—for example, in the disagreement among employers about the value of community colleges, especially in Frankton and Palmdale—we can only conclude that experiences have been so heterogeneous and often so idiosyncratic as to prevent any consensus from developing.

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[62] For a similar conclusion about poor "alignment" between community colleges and high-tech employers based on research in the early 1980s in Silicon Valley and the Route 128 area near Boston, see Useem (1986).

In this section we examine the skills that employers require, their hiring standards, promotion practices, and finally some trends which seem to be emerging. The results—particularly employers' stress of job-specific skills and certain personal capacities and the preference of employers for experience over formal schooling—contrast sharply with the practices of education providers. They also contrast with the simple (or simple-minded) assertion that sub-baccalaureate jobs will require more formal schooling because they show how varied the role of formal schooling is. The trends are also disturbing because they suggest that—at least in the absence of any intervention—sub-baccalaureate labor markets are likely to become even more fragmented, disjointed between providers and employers, with increasing cyclical variation and inconsistent incentives to individuals and education providers. The results in this section are therefore necessary to an overall understanding of how well sub-baccalaureate labor markets operate, but they make the need for fundamental changes even more imperative.

The Skills Employers Want

From recent studies and commission reports, a convention has developed about the skills employers require—many of which were consistently mentioned by the employers we interviewed. One common conclusion in recent reports is that the skills crucial to employment include a variety of capacities—including motivation, initiative, judgment, the ability to work with others, communications skills, and other abilities included in what the SCANS (1991) report calls "foundation skills"[63]—which are not directly taught in schools and which are quite different from the technical skills required of computer programmers or electronics technicians or proficient drafters. A second nearly universal conclusion is that the basic skills of much of the labor force—the ability to read simple labels and instructions, for example, and the ability to write reports and fill out forms and simple arithmetic skills—are weak. There has been little consensus, however, on the role of technical or job-specific skills including those normally taught in postsecondary institutions—for example, the knowledge of accounting procedures and spreadsheets, familiarity with standard business practices, the command of various computer languages and architecture, facility with electronic circuitry, and the ability to machine parts with a variety of equipment. One survey of employers suggested that job-specific knowledge in jobs requiring "some college" are less important than motivation and other "foundation skills" (McPartland, Dawkins, & Braddock, 1986)—though thirty-four percent of employers still say specialized knowledge is extremely important.[64]

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[63] The term "foundation skills" has been popularized in the SCANS (1991) report. In that report, foundation skills include three categories: basic skills, including reading, writing, mathematics, listening, and speaking (which includes several dimensions of what employers refer to as communications skills); thinking skills, including creative thinking, decision making, problem solving, "seeing things in the mind's eye" (i.e., processing symbols, graphs, and other forms of information), knowing how to learn, and reasoning; and personal qualities, including responsibility, self-esteem, sociability, self-management, and integrity. There are some differences between the foundation skills of the SCANS report and the motivational and interpersonal skills mentioned by employers in our four labor markets, but the overlap is substantial.

Furthermore, while a general consensus has developed that the quality of education needs to be improved,[65] the role that formal schooling plays in employment success remains unclear. In surveys of employees undertaken in 1983 and 1991, the importance of education varies substantially among various segments of the labor market. Those with baccalaureate and graduate degrees (as well as individuals in the highest managerial and professional occupations) reported that formal schooling is much more important than formal or informal on-the-job training in obtaining their job. By contrast, only small numbers of those with a high school diploma (15% in 1991) reported formal schooling to be important, while twice as many (30.3%) required formal or informal company training. In between, however, individuals with "some college" reported that formal schooling and on-the job training are equally important, with 36.5% responding that formal schooling was necessary to obtain their job, 31.9% reporting that on-the-job training was necessary, and 16.1% citing formal company training. Within the sub-baccalaureate labor market, then, the balance of formal schooling and experience or on-the-job training is approximately equal, though the balance necessary may vary substantially from occupation to occupation.

The responses from employers in the four labor markets we examined were, fortunately, highly consistent. Even though these employers varied in size, sophistication, and sector, they repeatedly stressed the importance of skills in five distinct areas.

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[64] For jobs requiring "some college," thirty-four percent of employers rated "specialized knowledge" as extremely important, compared to ninety-five percent for dependability, eighty-four percent for proper attitudes, seventy-nine percent for being a good team member, seventy-two percent for basic adult literacy, and seventy-one percent for the ability to perform basic arithmetic. The results of this survey therefore corroborate our findings that behavioral traits and basic skills are much more of a problem to employers than are job-specific skills.

[65] See especially Commission on the Skills of the American Workforce (1990), SCANS (1991), and a series of other commission reports back to *A Nation at Risk* (NCEE, 1983).

Job-Specific Skills

In our interviews, the dominant skill required by the majority of employers was facility on specific machines or with particular manufacturing processes (for business occupations, accounting, and the like), familiarity with procedures specific to a given job (e.g., accounts receivable or cost accounting), or familiarity with a specific computer program (i.e., highly job-specific skills). For drafting, for example, the head of a firm in Cotooli that employs contract drafters described the specificity of different CAD systems:

> In any case, you do a certain amount of targeting. I mean, if they ask themselves, "What do I want to draft?" and if the answer is I want to draft aircraft, then they should see what the GE, the Pratt and Whitney, the Allison, and the McDonnell-Douglas systems are. On the other hand, if you say, "Well, I want to live in Cotooli and work on [consumer products]," there's only one answer: AUTOCAD—you've got to know AUTOCAD or you're out of the business. So they need to look and target and maybe do some soul-searching and some marketing and take a little risk.

Consistently, the kind of job-specific preparation that educational programs provide was criticized as too general. For example, a manager of electronics technicians for a semiconductor firm complained,

> What we'd really like to have [in addition to basic mathematical skills] that we can never really find is things that are more focused on semiconductor processing. There is no hope of finding somebody out of school who has done anything in plasma processing or knows what lithography is or any of the basic diffusion. We actually would have a course for our own technicians where we say, this is diffusion, impurities diffusion, sifting solids at different rates at different temperatures, and [we] start going through and teaching that; here is what plasma etch is and here is how you create plasma and here is how you set up electric fields to etch. All that stuff we have to teach on our own because I'm not aware of any college anywhere that we could get qualified students.

In some cases, employers acknowledged that school-based programs could not possibly meet their needs because the demands of the job are too idiosyncratic. As a manager for a Frankton cable manufacturing firm said,

> Unless you've worked in plant maintenance in the past, it's really hard to come in here and start working. Plant maintenance is kind of strange. Industry is not standardized. Electronics technicians come in [from educational institutions] and see our technicians all greasy and funky from the equipment, and they don't know what to make of it—they don't want any part of it. There are just so many different variables. This plant needs a specific type of worker. To train for this specific type of worker—I don't know if you can actually do that.

This particular individual recommended more work-study programs as a way to combine more general education and job-specific training, a solution similar to the co-op programs in Cotooli; but in the absence of such a program, he stressed the value of experience in hiring decisions.

The overwhelming importance of highly specific job-related capacities helps explain many other aspects of employment practices in the sub-baccalaureate labor market, especially the reliance in hiring on experience doing similar kinds of work. Consistently, when employers mentioned sending employees back to school, they did so in order to have them learn the particular computer systems or production technologies required on that specific job, not for general education.

Motivation and Interpersonal Skills

Employers also commonly mentioned a number of motivation-related and interpersonal capacities, including several included among "foundation skills": motivation, initiative, judgment, an appropriate attitude (especially in services and occupations dealing with the public), and communications skills. Indeed, while technical and job-specific skills are important, many employers rated certain "foundation" skills—especially motivation—as even more important. The manager of a custom machining company in Cotooli described the importance of technical skills and motivation in the following way:

> Skill is nice but not—we have guys out there who are super-skilled, but you can't get anything out of them because they don't feel like working that day. You have other people who are adequate [in their technical skills] who work hard all day—you're going to get just as much out of them.

In a particularly thorough definition of these skills, one electronics firms in the Rosefield area developed specifications for electronics technicians by getting all six supervisors to come to a consensus about the requirements of effective technicians. The process resulted in the following list:

- alertness, further defined as "attention to detail, awareness of the environment, an ability to identify and resolve problems through observation";
- policy procedures, involving the steps necessary for a "clean room";
- decision-making problem-solving, or "setting priorities and communicating those priorities";

- analytical problem-solving, defined as "more deductive reasoning" than is involved in decision-making problem-solving;
- tolerance of ambiguity;
- coping, "the ability to deal with several different issues at the same time in the work environment";
- commitment to task: "What's more important, taking a break or following through?"
- decisiveness;
- assertiveness; and
- versatility.

One crucial skill is initiative—particularly, as several employers expressed this capacity, the combination of initiative and responsibility that one described as "ownership." As the director of human resources of a sophisticated high-tech manufacturer in the Palmdale area expressed this capacity, commenting on the electronics technicians who had been unsuccessful,

> It's the lack of willingness to take ownership [that causes people to leave], not being forward. If you see a problem, you own it, regardless of who you are and what level you are at. That's kind of a cultural thing here. Sometimes it's not well-received by people: "I'm here to do my job and that's all. Just because there is a problem over here, it doesn't mean that I'm going to do anything about it." I think that's where the majority [of problems with employees] come in.

Similarly, the manager of an accounting department complained about the difficulty in getting people who are "interdisciplinary":

> There are many things within our organization that require coordination across departmental boundaries. Problems arise. What we're trying to do is train our people to respond to those problems and get an effective solution as opposed to compounding those problems. That's one deficiency we've seen in people coming in the door.

Motivation and persistence—a "good work ethic"—is important in every kind of employment, but it becomes especially crucial in production facilities with flatter hierarchies where individuals have several responsibilities: The absence of any one person or an individual's tendency to slack off is more likely to hold up other workers. Initiative and judgment are increasingly necessary in workplaces where hierarchies have been flattened simply because there is less supervision and a greater reliance on individuals. Similarly, communications skills become increasingly crucial as responsibilities expand and work becomes less routinized because one employee is more likely to have to communicate with fellow workers or with suppliers and customers in order to maintain the flow of production.[66] In some cases, interpersonal skills are paramount in hiring. For example, a brewery in Cotooli adopted a team structure for production. When they began hiring for the facility, one of the human resource managers reported,

> We focused not on technical skills but on interpersonal skills. We knew we could give them technical skills—that wasn't the issue.

In several ways, then, the importance of these kinds of personal and "foundation" skills is linked to trends in employment: the flattering of hierarchies, the elimination of supervisory layers, and the tendency for employees to have more responsibilities and to interact with a wider circle of other employees.

Aptitude and "Common Sense"

A large number of employers mentioned dimensions of "aptitude"—a facility which they could identify but which could not be readily taught, in their view. Thus, those hiring machinists look for mechanical aptitude, and sometimes "test" for that by asking applicants about their hobbies. Others mentioned the importance of visual aptitude in drafters, aptitude with numbers for accountants and others working with numbers, and aptitude with people for those individuals working directly with customers. In these cases, aptitude describes a facility with a certain kind of task that speeds up production and minimizes errors, an enjoyment of the task that improves the elusive fit between individuals and their jobs.

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[66] One educator interpreted the emphasis on certain "foundation skills" as a cover for racism: The stress on communications skills works to the disadvantage of non-native speakers—and both Asian-American and Hispanic immigrants are numerous in the Palmdale and Frankton labor markets—as well as to African Americans who do not speak standard English. As a placement center director in a suburban community college within the Palmdale area claimed, "Employers say they want excellent communications skills regardless of whether the job really requires it. To me it's, in many cases, discriminatory actions." On the other hand, a placement official in a nearby community college related several stories of limited-English students who were dismissed because of their inability to understand directions. To verify which interpretation of the stress on communications skills is the most plausible would require careful ethnographic research, so this is a question we cannot resolve. It is possible that both views are true: that communications skills are more crucial in reorganized workplaces but also that employers underestimate the language competencies of new immigrants and cannot readily distinguish between those competent for a particular position and those who are genuinely not facile enough with English—and so tend not to hire any of them. However, it does reinforce a conventional conclusion about trends in the labor force: Whether inequitable or not, communications skills are an increasingly important job qualification.

In some cases, of course, individuals lacking a necessary aptitude find their way into an occupation nonetheless, but it is not always possible for them to compensate for the lack of aptitude with other skills. The director of a firm in Cotooli that hires contract drafters described a change in drafting with the coming of CAD and the decline of certain visual capacities:

> You're seeing a subtle revolution in the drafting field. It used to be that your drafter . . . was probably a person who could visualize. . . . They have a real conceptual mind. Also what you had in the past were a lot of frustrated artists who got into drafting. "Well, I can't be a Van Gogh or Picasso, but I like to draw and I have this capability, so I can use my artistic talent and make money doing it." So you really had frustrated artists with concepts doing this. Today you've got computer people doing this . . . . You're dumping out your frustrated artists and really bringing in the computer hackers . . . because a CAD operator can make drawings without the skills and knowledge of manual drafters. They are not artists. But with a computer they can draw a picture of an airplane or a turbine engine as well as a manual drafter. The only difference is the CAD operator cannot think conceptually and does not have design skills.

Another elusive capacity mentioned by several employers is "common sense." What "common sense" means to various supervisors is not always clear, but it seems to refer to the judgment necessary in any work situation to avoid mistakes, to facilitate and speed up production. One of the clearest discussions of "common sense" came from an engineering manager in a Cotooli semi-conductor firm:

> We're looking for common sense, which is something that schools aren't real good at. There's nothing in the school system to test that. I've worked with a lot of book-smart people. I'm a mechanical engineer myself and you get the guys that excel within the academic environment that—if it's in a textbook, textbooks tend to be black and white. There is *a* correct answer and if there's usually enough information provided, they do fine. They study well; they test well. In the real world, you don't have the certainty. You don't necessarily even have the optimum point on the curve-type scenarios. You have to go in and you have to find something, understand what's wrong with it. It's dirty, it's messy, you have multiple conflicts for your time. It's a different environment. One that at least the academic environments I've been through don't mimic well. . . . Knowing something is only half the equation if you can't produce results with it.

In this description, "common sense" is the ability to apply knowledge—including the kind of job-specific skills learned in school—in production settings whose complexity precludes there being any simple correct procedure or "textbook" solution. But such a facility, while it may be impossible to teach except in the work setting, is anything but "common"; it requires both deep understanding of production process and the capacity to weigh several competing goals in order to judge the appropriate steps to take. In a production setting where individual employers have greater responsibilities and less supervision to help them through problems, "common sense" becomes an increasingly important capacity.

Basic Skills

A fourth area of skill cited as necessary in almost every employment situation includes the basic skills of reading, writing, and arithmetic. As the widely cited commission reports have stated, the employers we interviewed complained constantly about the lack of basic skills among their sub-baccalaureate employees—with emotions ranging from bitterness to bewilderment but always accompanied by some anger. "The education system is falling apart," said one personnel manager in the Rosefield area: "Local school systems are highly political and very disorganized, [and] the kids suffer." This particular company used to have internships—presumably, given the need for screening and experience, an ideal way to educate new workers—"but we have found out that it is not cost-effective for us: The students don't have the three Rs." Some blamed the process of "dumbing down" the curriculum for deficiencies in basic skills. A manager of a machining shop for a large Cotooli employer—a firm that found it had to provide remedial math to many employees—described the process as follows:

> What [vocational schools] tend to do is, students are there, they're not excelling in the academic classes, so they're obligated to give them something. And they lower the level of training to what the people in the class can accept. They lower [standards] down so that the people will not fail, but at the same time they really hurt the people.

In many other cases, employers complained that applicants have sufficient technical skills but lack basic cognitive skills for the job and that basic skills are being given short shrift in overly short training programs. As the director of personnel for a large machining firm in Palmdale complained,[67]

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[67] This individual provided several examples of individuals whose math skills in algebra and trigonometry were deficient to back up his contention of deficient math skills. He had been to visit a well-known local community-based organization that provides JTPA and JOBS training, an area vocational school, the local community college, and an adult school providing some vocational education, so he was more knowledgeable than most about local education providers. His estimate of 1,000 to 2,000 hours of training is high for some of these programs: Many of them range between fifteen and thirty weeks or between 500 and 1,000 hours if

> Kids coming out of these programs after one year want to be machinists. And it's just a longer process than that. And these programs, they try to feed so much into them in this 1,000 to 2,000 hours that they're doing, they try to run the gamut between some math, some blueprint reading, but they skip on those to get them onto the machines, and when they don't have those [basic] skills they become nothing more than just operators.

Similarly, a personnel manager of a highly technical manufacturing firm in Cotooli bemoaned the one-sided education of his technical employees:

> We just went through a whole series of really exhaustive testing in both math and verbal skills of all of our workers from our plant managers down. And what we found—even among our professional, so-called four-year-degree engineers, all the way down to our newest hires—was a very one-sided education. Our machinists, engineers, electronics folks, and what have you had absolutely no problem with the math. Their verbal skills were atrocious. And in the training site of our facility, one of the things that we have found is that you can't train a quality, experienced machinist in anything else requiring additional skills because he has to be able to read the manuals, he has to be able to communicate his needs to the instructors, and likewise he has to interact with the other students who are going through the training. . . . Likewise, we have our other folks—technicians, managers, whatever—who have great verbal and communications skills but don't know anything about math. . . . And I will tell you, as a representative from our site, people without both sets of skills can't be hired at our company. And I don't think the schools are doing an adequate job in that area. You've got to have the math skills; you have to have the verbal skills. They're equally important. And so if you're talking about the vocational and technical side, don't forget the other side.

Other employers at the same meeting[68] corroborated his point:

> A lot of the vocational high schools, when you look at their curriculums, in some cases they've dropped away some of the humanities and the verbal side of the training for the sake of concentrating on vocational or technical skills that they're trying to impart.
>
> That's absolutely one of my pet peeves. Vocational schools will come to you and say, "Well, what do you want as entry-level requirements," and then they'll develop these entry-level requirements, and some of them are skill things, but the educational level of things are always less than the high school level. Well, I don't want that.

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the program is full-time (seven hours a day); but several are part-day programs of about three hours a day, totalling 225 to 450 hours. A community college program might include several courses, each with about 150 hours of contact time; so a sequence of four or five courses would still total only 600 to 750 hours. An associate program would easily reach 2,000 hours, but the number of individuals completing associate degrees is small.

[68] These interactions took place at a focus group attended by eleven employers in the Cotooli area. Note, however, that the complaints about one-sided education in the school contradicts complaints from other employers about the incorporation of "irrelevant" academic material in community college programs.

Although complaints about basic skills usually refer to the cognitive capacities acquired in school, many employers tended to lump motivation with basic cognitive skills; they glide from complaints about academic deficiencies, blaming the schools, to complaints about discipline. As the director of an employers' association in Frankton reported,

> Employers are concerned that employees are coming to them and they don't have the basic skills, and they don't understand that [basic skills] are job-supportive. I mean, they come, they can't fill out an application form. They're sloppy; they don't come to work on a regular basis. What is going on out there? The work ethic isn't the same as it used to be.

Many individuals, both educators and employers, mentioned motivational problems and literacy as the crucial issues facing education. Most spoke of these problems as a recent development, as a problem of the younger generation. For example, an employer in Cotooli complained about the change in "values":

> When you start out as a young pup out of technical school in the manufacturing jobs, a lot of them, because they're low on the totem pole, end up working night shifts. Now, when I started, that was accepted. You worked night shift, paid your dues. I wonder how many young kids, if you told them they'd have to give up their evenings—they don't like that. I mean, their values have changed.

Employers and educators seem to agree about a generational change. As an electronics instructor at Rosefield City College asserted, using the very common assembly-line metaphor to describe education,

> The raw material [i.e., the students] coming in right now isn't the same quality it used to be. It isn't as prepared as it was. It needs more finishing before it reaches this final assembly point. I think it's sociological change—this ideology of wanting to become a chief and not an Indian [i.e., wanting to be a manager and not a production worker].

While it is not always clear how production breaks down when employees lack basic skills,[69] once again the shift to flatter organizational hierarchies where individuals have a wider range of responsibilities and are expected to cope with problems on their own may be responsible. Employers spoke frequently of the need to read instruction and repair manuals, to make appropriate calculations on their own, and to learn by themselves instead of relying on supervisors to tell them how to work out some problem. The need to retrain workers, especially in computer-based technologies, is another change that makes certain academic skills crucial. For example, a plant manager spoke of the need to teach all machine operators some programming so they could reprogram CNC machines on their own rather than calling in a programmer from elsewhere in the plant, but he reported their math backgrounds to be inadequate:

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[69] It is important to heed the warning in the ethnographic work of Darrah (1990, 1991): What employers interpret as problems arising from inadequacies among workers may in fact result from the disincentives and rigidities in production rules and work norms. In our research, we have had to rely on the reports of employers about necessary skills rather than on direct observation of workplaces, so our findings are precisely interpreted as what employers think about the skills required on the job—perceptions which then are translated into hiring protocols which are crucial to the relation between formal schooling and employment—but not necessarily as the truth of what modern production requires.

> Our main concern is to get all operators capable of programming machines. Now, we try to do that training here as much as possible, but it's tough. Having a mathematical background is the most important thing. People who come in here who've taken algebra and geometry in school, even if it's just high school level, will pick up on the programming of these machines just on their own, just by being operators—and the next thing you know they're doing programming work on them. If they don't have that mathematical background, the programming is Greek to them, so they aren't interested in it, and you can't get them interested in it because they think it's so far above them when it's not. And you can't even talk them into going to a school or anything like that.

The most concrete manifestation of the necessity of basic skills is the nearly ubiquitous requirement of a high school diploma; without a diploma, no applicant will even be considered for the occupations we examined. Employers generally avoided the JTPA and JOBS programs, which include many clients lacking in basic skills. Otherwise, however, employers appeared stumped about what to do to remedy deficient basic skills; one employer of clerks and secretaries who found their language skills to be "ridiculous," said,

> I'd like to see something there [to correct basic skill deficiencies], but I don't know. That must be something that is a personal pride or something because you can get the best person from a vocational school and they can't spell. And I just can't understand that.

These employers have not generally instituted their own basic skills test, some of them because they fear lawsuits. Only a few employers within our sample have sent their employees to remedial programs or invested in workplace literacy programs—though this may be taking place in several hidden ways. As an employer in Cotooli remarked,

> One area in which I see a lot of partnerships [with education] going on is in the skills enhancement stuff where companies are assessing their people and they're finding out, "By God, it really is a problem; it's even worse than we thought," and developing programs with local schools to encourage people

> to prepare themselves for career improvement and so forth. It gets all kinds of nice handles, but it's basically remedial skills.

In general, however, employers regard the secondary schools as responsible for instilling adequate basic skills and express considerable anger and amazement that education has failed with so many of their prospective employees.

Computer Skills

Another skill requirement that is nearly ubiquitous is familiarity with appropriate computer applications and programs. Business occupations now use word processors, spreadsheet programs, computer applications to calculate payrolls and taxes, computerized information storage, and computerized inventory control programs; drafters have moved from drawing boards to CAD programs; machining is moving to CNC machines; and most manufacturing facilities include some computer-assisted and computer-driven machines. The rise of computer applications provides a role for formal schooling, and—as mentioned above—education providers have responded with a variety of computer courses in both their regular offerings and in contract education.

As a result, many employers look for some computer skills when they hire and—consistent with wanting preparation that is as job-specific as possible—prefer to see applicants familiar with the specific applications and programs they use on the job. However, one surprising finding is that most employers feel that they can teach relevant computer skills on the job or that individuals can learn such skills on the job. One manager reported requiring a baccalaureate for drafters but admitted having an excellent self-taught drafter; others reported taking experienced machinists and teaching them the programming required for CNC machines on the job. As a result, formal schooling is not necessarily a prerequisite for jobs requiring computer skills since they can be obtained in several different ways.

Not surprisingly, the use of computer skills varies across labor markets. In Frankton, several educators mentioned that many firms are still not using computers in drafting and machining; because of its agricultural base, Frankton employers have been slower to adopt new technologies than those in other areas. However, the trend is clear even in Frankton, and so knowledge of computer applications is quickly coming to be routine.

Cross-Training in the Flexible Workplace

As we mentioned in the previous section, new organizations of work have tended to expand the responsibilities of individual employers and to blur the distinctions among specialized occupations. Individuals need a greater repertoire of skills than was necessary in older, more specialized and fragmented forms of work, resulting in the need for "cross-training," training for what used to be distinct occupations.

Within sub-baccalaureate positions, the need for cross-training arises in two dominant ways. One pattern is that firms combine several jobs or have individual workers carry out several kinds of responsibilities. For example, the firms that have a variety of machines, from relatively old mechanical equipment to CNC machines, must have operatives who are skilled in traditional craft skills and able to program CNC machines, and their repairers must be able to work with the electro-mechanical systems of older machines as well as the electronics of new machines. In business occupations, clerical workers perform secretarial and accounting responsibilities and need to know several different business systems and computer applications. In this pattern, the skills required are not necessarily more complex (though they often require employees being able to perform on computers); rather, each worker needs a greater number of skills. This pattern appears to be more common in smaller and less advanced firms which cannot afford the specialization which a larger firm could support; in these small firms, the boundaries among occupations are likely to be especially blurred.

A second pattern develops where firms expand the responsibilities of production workers to include communication with suppliers, customers, equipment manufacturers, and managers within the firm—that is, to take on more managerial and administrative responsibilities, including tasks that would previously have carried out by another layer of hierarchy. For example, a director of training for a Cotooli consumer-products firm—an individual who stressed the importance of communications skills—commented,

> A good number of the technicians we've brought into the plant within the last two or three years who have two-year vocational degrees have clearly outperformed some of our technicians who had been here twenty or thirty years. We were shocked how many of the older people lacked in the area of reading and math—people who are our highest-level mechanics and electricians. [The newer hires] have been very strong in that they have these degrees, and their leadership skills have been much stronger than those of some of our technicians who have been here twenty or thirty years, who were told to check their brain at the door when they came in and do the same task for eight hours. And now we not only want people to perform tasks,

> but we also want them to lead teams and try to come up with improvements to move the business forward and so on. . . . You can be the best electrician in the world, but you need to be able to communicate and lead and be able to develop teams. . . . They can't communicate; they can't train others.

In these cases, as part of greater responsibilities, employees need communications skills, problem-solving abilities, and the initiative not only to identify problems but to take the steps necessary to resolve them—all capacities usually viewed as "higher-order skills," and different in kind from the skills required for routine production. These are situations in which prior on-the-job experience is not useful in developing the required capacities, and employers may find it necessary to retrain certain workers—for example, in contract education courses in communications skills or TQM.

Contradictions in What Employers Want

In employers' descriptions of what skills are necessary, there is a contradiction that arises time and again in slightly different forms. On the one hand, employers value highly job-specific skills—skills which are sometimes too specific to be taught in education institutions and which must be learned on the job. They then look for experience in using those skills—one rationale for experience as the dominant hiring criterion, as we explore in the next section—and for educational programs that are as specific to their production processes as possible. One common criticism of educational institutions, as we will see in the next section, is that they include too much "theory" and not enough hands-on or specific training as well as general education components with no relevance to work. On the other hand, employers complain about the lack of general and "academic" capacities, including the abilities to read, write, and communicate in other ways; the ability to understand and apply math in unfamiliar settings; and other "basic" capacities that are more likely to be taught in more general school-based programs and in academic or general education courses; and some employers castigate occupational programs for concentrating on specific skills to the detriment of more general capacities.

Perhaps employers simply want their workers to have every conceivable capacity. However, a different explanation of this contradiction is that the skills necessary for entry-level employment are much more specific than those required for promotion and positions of increasing responsibility. In our interviews, those individuals who stressed specific skills were more often production-level supervisors, while those emphasizing the lack of more general capacities—"common sense," problem-solving, and other higher-order, less specific skills—were more frequently personnel managers and those who viewed the firm from upper levels in its hierarchy.[70] The same kind of division also emerges from firms of various size: The kinds of small firms who are more likely to hire individuals directly from community colleges and some high school programs often stress specific skills, while the larger firms who hire more experienced workers for positions of greater flexibility and responsibility emphasize more general capacities.

The problem is that the skills necessary in the short run may obscure, to students and educational providers alike, the skills necessary for promotion and mobility in the long run. If some employers press educational institutions to provide highly specific skills, then they may fail to teach those capacities which are crucial for promotion—as the employer cited above corroborated in complaining that schools developing entry-level skills suffer when "the educational level of things are always less than the high school level." What is even worse is that the job-specific skills that can be taught in occupational programs may still not be specific enough—as the overwhelming reliance on experience documented in the next section indicates. This leaves students from occupational programs in the worst of both worlds—lacking the specific skills necessary for entry-level jobs but without the more general capacities necessary for promotion over the longer run.

In reviewing the skills which employers claim are the most crucial, one striking conclusion is how *unimportant* the kinds of capacities usually learned in formal schooling are. The technical skills required on the job tend to be more specific than community colleges and area vocational schools can offer, and many of them can be (or must be) learned on the job. Certain capacities—aptitude and "common sense"—cannot be taught in schools and colleges, and the behavioral and interpersonal capacities (including interpersonal skills and motivation) included among "foundation skills" are often viewed as innate characteristics. Of course, general technical skills can be taught, as can academic capacities and computer knowledge. However, it is striking to see how many of the skills employers perceive as critical are not learned in school—so it is not surprising to find the role of formal schooling in hiring standards to be relatively weak.

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[70] Similarly, the complaints in many of the national reports have come from business representatives at high levels within their firms, not from production-level supervisors.

Hiring Standards: The Roles of Experience and Education

The need for highly specific skills means that virtually all employers in the sub-baccalaureate labor market look for experience when hiring, particularly for experience in virtually the same kind of procedure or production facility. Much more than formal schooling, experience is an indicator of the skills which employers value in sub-baccalaureate positions: mastery of specific machines, production processes, or office procedures; motivation and persistence; and the ability to work with others. Given the unavoidable uncertainty about a new hire, requiring substantial experience is the best way to reduce that uncertainty. Over and over again, employers in all four labor markets insisted on the importance of experience over formal education—even for relatively low-level positions like accounting clerks. As the compensation manager for a Palmdale firm acknowledged,

> It would be unlikely that anyone could come directly [from schooling] into this [position], although it's not exactly a high-level job; but we're even requiring several years of accounting experience before someone could be in that position.

It is usually crucial to have experience in work specifically related to the firm's production process. For example, the director of machining for a company that makes castings reported that he looks for experienced machinists, but only

> if I can find [experience] related to castings. You have to know what to select as a cutter, how to use the cutter, but there's a lot of technique with machining castings, you don't just throw it in the machine and hit the button. . . . Basically what I'll see [and hire] is a person who's been a machinist for four or five years and they'll have smatterings of machine castings; two or three times in their career they've learned castings.

Similarly, the manager of manufacturing precision metal-working machinery looks for

> experience, and [other skills], depending on what we're looking for at that time. We usually have a specific need. We need an engine lathe filled or we need a CNC grinder filled. So we're looking for someone who can run that type of machine.

In some cases experience is required because of technological sophistication; the human resource manager of a semi-conductor firm in Palmdale said,

> The demands of the factory are so sophisticated it takes someone with quite a bit of experience to understand and appreciate the environment they're going to be working in. What we don't want to do is turn a beginner loose

> on a four million dollar machine. So therefore what we're looking for is experienced people.

In other cases, experience is an indicator of personal skills necessary for the job. For example, a payroll processing company in Cotooli which stresses personal service to their customers looks for experience in any personal service capacity:

> We feel that we can give technical and payroll training, but we can't change anyone's personality; we can't force them to be nice on the phone—so we basically go by service experience. Have they worked in a service industry and given quality service?

Given the ubiquitous demand for experience—and preferably experience specific to particular job demands—formal schooling is generally insufficient for hiring. Even in the Cotooli area, where the co-op program has established close working relations between education providers and employers, experience still dominates. As the human resource manager for a moderate-sized (230 employees) tool and die company described their hiring,[71]

> When people come out of [the local community college and area vocational schools] they still truly have [only] the basics. Now, granted, they have a lot stronger basics than what we would normally find if we were just hiring somebody off the street. But we still consider that to be without previous shop experience. We would consider that to be entry-level. We would have a window between $6.00 and $7.50 an hour. That is what we would normally pay someone that was just coming out of a vocational school or out of [the local community college] with little or no experience. Because truly in those areas, the experience is really the key. You can't truly learn everything there is to know in the classroom in order to excel and climb up the ladder. They're not going to go to a school and come in here at the top. It will not happen.

In a few cases, employers did acknowledge that a combination of formal schooling and experience would be ideal or that education made progress on the job easier. As a personnel manager for Palmdale credit union mentioned,

> I have personally noticed that those individuals who were hired because they had a two-year or a four-year degree in comparison to others who have worked their way up tend to know their job and take less time in training to learn their job than those who have worked their way up and are cross-trained. The level of what they can do on the job is far more advanced

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[71] This firm has established an apprenticeship program for machinists with the local community college mentioned in this quotation, so there is substantial contact with the institution. This is not, therefore, a complaint about the community college being out of touch with the needs of industry, as is frequently the case in other labor markets; rather, it reflects the volume of what skilled machinists need to know.

> because they have the technical background to do it. . . . You can only do so much cross-training and then you really need [formal schooling].

However, this firm requires experience for virtually all its employees but does not compel its employees to have postsecondary education, so its practices contradict the statement about the superiority of better-educated workers.

Even in the cases where there is some recognition of the value of schooling, there remains some ambivalence about formal education, a tendency to hedge about its value, and a sense that in any specific hiring decision the individual with experience would win out over those with formal schooling. An excellent example of such ambivalence toward education came from the plant manager of a food processing company in Frankton:

> I always like to hire somebody who has some experience in a college environment. It says something about the person's integrity. They understand that education is important. It balances you out. I'm a firm believer that you can learn it all on the job, but I think it's good to have some of that textbook theory behind you. But experience is very important, and someone who has spent all of their time in school is going to have some hard knocks ahead.

This firm wanted their machinists to have five years of experience and acknowledged preferring experience over education in all their positions—effectively undermining in practice whatever individuals might believe about the value of "textbook theory." Similarly, the human resource manager for a large computer networking firms in the Palmdale area said the following about hiring individuals for business management:

> It would depend upon what work experience they've had as to whether we'd be interested. For example, we hired someone in our department, in employment, who was working as a temporary in an employment department in a clerical position. She did have an A.A. degree, I think it was in general business, but it was really the work experience that did it. . . . An A.A. business degree by itself wouldn't buy a whole lot.

In part, the ambivalence toward formal education is linked to the need for highly specific skills which are too narrow to find in any educational institution. For example, the personnel manager of a Frankton firm that produces box-forming and cartoning machines reported,

> I have specifically told [the engineering manager] that I do not want anyone any longer whom we have to train. I want someone with either a college education, even if it's [the local community college], or junior college

> education, but I want somebody who has some background and work experience if possible.

However, she then went on to complain about the impossibility of finding education programs specifically related to carton equipment manufacturing:

> You can have a super education, [but] if they don't have anything in our line of products, it's worthless. It's start from square one. . . . There is, only, I think, one college in the United States that really has a program that trains for our industry, and I think it's . . . in the Midwest. . . . I think it [the skill required] is just too specific [for colleges to offer programs]. I think, it seems to be my experience, if you end up getting a job with one of these companies, you pretty much stay in this industry for the rest of your life.

In practice, then, experience is the only way to break into this industry, despite whatever general value schooling might have.

In most firms, it is difficult to compensate for a lack of experience with sub-baccalaureate credentials. While a combination of experience with some community college coursework might be ideal for some positions, an individual without experience would not find a position simply by accumulating community college credits. There are some exceptions, especially for low-level positions; but in these cases, postsecondary education is simply an alternative source of learning particular skills, not a requirements. For example, the director of personnel for the phone company in Rosefield stated:

> For our general clerical jobs, applicants must have a two-year degree from either a business college or a community college or experience to be qualified. Those with the educational background aren't really rated higher than those with just clerical experience. . . .A two-year degree really does not make someone a better candidate than someone who has a work history and no college. We give most of our applicants general aptitude tests; we also give tests in skills such as typing, keying. They just have to meet all the basics. So a two-year degree doesn't really give anyone a higher rating.

In only two cases did we find a relatively clear trade-off between experience and education. As the personnel director of a high-tech manufacturing firm in Palmdale described it,[72]

> The rule of thumb is two years experience for every year of education. If [applicants] have been doing test technician work for four years, again the

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[72] The other example came in a revenue accounting department of a Cotooli employer who said that an associate's degree was the equivalent of two or three years of experience.

> rule of thumb would be the equivalent of an A.A. degree—if they were paying attention [in college], and it doesn't always hold true.

However, this is also one of the few firms that require an associate degree for their technicians, so it is an exception to the general pattern of insisting on experience over formal schooling.

The only exception to the general pattern of requiring experience among new hires came in a few companies working with such advanced technologies that there is not yet a pool of experienced workers. For example, a firm manufacturing lasers in the Palmdale area hires its employees from an Iowa community college that has established a program carefully tailored to the firm's needs and from a proprietary school in Phoenix with a similar program; it cannot find individuals experienced in laser production because the technology is too new. But this example does not challenge the general pattern of preferring experience over formal schooling within the sub-baccalaureate labor market; it simply reflects a rarefied case where it is impossible for employers to find substantial numbers of experienced workers.[73]

The strong preference for individuals with experience creates a problem for new entrants into the sub-baccalaureate labor market: If every employer requires experience, it becomes difficult to enter the labor market and accumulate this experience. As one employer acknowledged,

> My feeling is that entry level is tough: They really don't have any place to go unless there's a tremendous shortage.

While the lack of experience is not a problem for individuals seeking upgrade training, it is serious both for new entrants into the labor force and for those being retrained who lack experience specific to the occupation they are trying to enter. One consequence is that upgrade training—as distinct from education for new entrants and retraining—seems to be more effective because the placement rates from initial training and retraining are likely to be low. The director of an area vocational school near Frankton remarked about an unsuccessful program to train unemployed individuals as drafters:

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[73] Community colleges could devise programs in these specialized niches as ways of providing direct entry into high technology employment. A few colleges have been able to do so, as the example of the laser manufacturer indicates. But this strategy cannot work for very many students since these areas of specialized employment are always likely to be small.

> If you were somebody who was a draftsman for fifteen or twenty years and you're just now learning the computerized part of it, you'll be pretty competitive. But if you're a high school student who wants to go out and get a job, it's gonna be really tough. So, in terms of being able to place a lot of people, that [drafting program for the unemployed] wasn't one of our wisest choices. Retraining for people who are already employed [that is, upgrade training]—that was great.

In fact, part of the growth of contract education can be attributed to the fact that upgrade training does not suffer the uncertainty about placement typical of education for initial entry and retraining.

Given the importance of experience to hiring, the powerful advantage of the co-op programs so prevalent in Cotooli becomes evident: Such programs allow students to accumulate specific experience while they acquire formal schooling. A personnel manager for a prominent machine-tool company in Cotooli described the advantage to both the student and the firm:

> [Co-op students] have at least some experience and they know the application of what they're learning. . . . Once they graduate, we have a tendency to hire those people. So then, when they're competing [with other applicants], they're competing with other people who have two-year or college degrees, but they have some hands-on experience in the company.

Like experience, a co-op placement also allows employers to obtain information about personal attributes. As the director of technology transfer for a technical institute in Cotooli mentioned about the co-op program,

> First of all, it's a screening test for them to see, "Do I even want to hire this guy?" I know their work ethic; I know their work habits.

In whatever form it takes, experience conveys information about job applicants that formal schooling by itself does not.

The providers of education in the Cotooli area are equally aware of the importance of experience (in sharp contrast to educators in the other three areas who made little reference to experience). As one of the coordinators for the co-op program at the well-regarded technical institute in Cotooli acknowledged,

> The most important thing is that because it is a two-year school, that two years of education really just gets them started educationally on a career. And a lot of employers wouldn't be able to capitalize on just that education if the students hadn't had some hands-on experience besides the labs.

> We've got about a 60/40 mix of lab/theory, in favor of theory by the way. And so the lab work is not enough to make a typical student credible on the job market. So cooperative education experience definitely helps.

Given the importance of experience in gaining access to jobs in the sub-baccalaureate labor market, it remains unclear where individuals get their initial experience. We suspect that there are many sources: Some start working for temporary help agencies (as several educators mentioned, especially in Palmdale); some gain experience as part of school-based programs, like co-op placements; some work initially for smaller firms which cannot require experience; and some work their way up from unskilled positions.

Hiring Procedures and Tests

In addition to requiring experience, it is possible for employers to devise formal and informal job tests to see if applicants are qualified. In most cases, these involve interviews. Often—particularly in firms that were self-consciously trying to make their production workers more responsible—applicants are interviewed by teams of production workers. For example, one high-tech manufacturer in Palmdale uses a "behavioral interviewing technique" with four to eight current employees; the interviews start with sets of skills defined by the supervisor and ask the candidate in what ways he or she has used these skills. While this particular interview format appears to focus on technical job skills, it is also a way of determining the "entire profile of the individual," including communications skills, responsibility, and other aspects of personality mentioned as critical by the director of human resources; as a director of electronics technicians for a semiconductor firm remarked about their interview procedure, "We kind of have the department vote as to whether the person looks like they fit in." Another described the interview process for technicians in similar terms, stressing the importance of detecting particular personal attributes:

> Entry-level people don't have work experience, so it's a little hard to ask specific questions. It's more like a personality interview. I look at how they'll fit in with others and what their work ethic is. I ask, "What type of motivation do they have? What kind of initiative do they have?" I look for logical trouble-shooting skills. I look to see if they have shown motivation and initiative in their past experience.

Other job tests are informal or truncated performance tests. For example, one high-tech manufacturer has applicants for technical assembly jobs assemble a few parts and read mechanical drawings; applicants for quality control positions examine circuit boards with known defects; and applicants for electronics technicians take a thirteen-item test on digital technology. Sometimes these tests are quite simple but revealing, at least to employers. For example, the personnel manager of a box-forming equipment manufacturer in Frankton gives applicants for drafting and machining positions a blueprint:

> One of the skills [required] is reading the print. It might seem simple but there [are] a lot of people out there that—they say they've been in this work, and I say, "Well, here's a real easy print." And they'll look at it and you can just tell—that's what we always say, you can tell in the eyes. They're lost, it might as well be in Chinese.

Similarly, a supervisor of machinists asks applicants to read complex blueprints, and

> then I'll show them the machinery and ask them if they've ever run anything similar to it. Mainly, I'll ask them if they think they can do the job; 99.9% say they can, but you can tell if a guy's eyes get real big and he's never seen anything like it before.

In a few cases, managers ask applicants whether people fix their own cars as a way of examining their mechanical aptitude; in one idiosyncratic case, a personnel manager of a plastics fabricating firm asks interviewees about their hobbies:

> We don't hire people who say, "riding my bike, fishing." They have to like working with their hands on something.

For these sub-baccalaureate jobs, very few employers devise formal or complex hiring procedures.[74] It is likely that small size explains the lack of formal job tests for many employers, though even relatively large firms lack formalized employment-related tests, perhaps because of fear (or simply uncertainty) about the legality of such tests. One electronics supervisor of a large computer manufacturer in Rosefield reluctantly admitted that equal opportunity issues were responsible for the lack of a test—"it's too difficult to standardize that and to go through the legal requirements to having a standardized test"—and his supervisor asked, "Isn't it illegal to give pre-employment tests?"[75]

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[74] One of the very few exceptions is the municipal utility district in Rosefield, governed by civil service regulations, that has devised a "school-like" test for its accountant applicants.

[75] If a test is found to have a disproportionate impact on a protected class—women or minority employees, for example—then the employer must be able to show that the test is job-related (see Wilcox, Grubb, & Lee, 1992, pp. 41-35–41-50.3). The employers we interviewed seem to fear the threat of a lawsuit rather than think that they cannot devise a job-related test. However, informal hiring practices as well as formalized hiring tests are subject to the same burden of proof, so relying on informal hiring procedures and experience does not help employers avoid the threat of a lawsuit.

The other ubiquitous way of reducing the uncertainty of new hires is to have a probationary period. Commonly, this is a ninety-day period after which employees can be dismissed for any reason. In a variant of this practice, firms sometimes hire workers from temporary agencies for ninety days or even longer, and decide at the end of this probationary period whether to convert them to permanent employees, keep them as temporary workers, or let them go.[76] One bank carried out the identical practice by hiring individuals as part-time "interns" for six months, after which they were reviewed for permanent positions. In this way probationary employees can be readily dismissed if they do not work out without risking lawsuits or unemployment insurance claims. In essence, a probationary period can be interpreted as an extended job interview: During that period, the workers in a firm can observe a new hire's skills, motivation, ability to work with others, ability to learn new tasks, and adaptability. What is crucial about probation as a kind of hiring mechanism is that (like experience itself) it emphasizes performance on the job and provides no advantage to educational credentials unless formal schooling has made the individual perform better.

The Value of Sub-Baccalaureate Education

Because of the dominance of experience, informal job tests, and probationary periods in hiring, we found little role for sub-baccalaureate credentials in the occupations we examined—with the crucial exception of the high school diploma, which is required for virtually every position. However, the certificates and associate degrees awarded by community colleges and technical institutes, the shorter programs available in area vocational schools, and the short programs that students put together by taking a few courses in a community college were rarely mentioned as hiring *requirements*. There is one important exception, however: Several high-tech manufacturers in the Palmdale area require associate degrees for their electronics technicians, particularly one international firm whose employment standards are set by the national headquarters in New York; many firms in Rosefield require associate degrees for electronics technicians; and several firms in Cotooli require associate degrees in electronics or electro-mechanical engineering for their technicians. Of the six occupations we examined, such requirements occur almost exclusively in electronics.[77] This kind of policy is established differently for different occupations; for example, the computer networking firm in Palmdale whose personnel manager declared that "an A.A. business degree by itself wouldn't buy a whole lot" also requires an associate degree for its electronics technicians, and the phone company in Rosefield whose personnel director acknowledged that "a two-year degree really does not make someone a better candidate" does prefer that electronics technicians have at least a two-year degree. The field of electronics is an exception, then, to the general indifference toward sub-baccalaureate credentials.

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[76] Some individuals work for extended periods of time for one employer but as the employees of temporary help agencies; we found examples of "temporary" workers staying up to three years in a single position. We will return to this practice in discussing the trends in the sub-baccalaureate labor market.

It is much more common simply to require a certain amount of training regardless of the source rather than to require a sub-baccalaureate credential. For example, another high-tech firm in Palmdale looks for two years of training but without differentiating whether it comes from formal schooling, the military, or on-the-job training at another firm—and it simply sees whether applicants have the requisite capacities regardless of the source.[78] As a result of focusing on capacities rather than the source of training, a number of educators acknowledged that sub-baccalaureate credentials do not have much value as credentials; as the dean of vocational education in a community college near Rosefield acknowledged,

> [Students] get a certificate so they have something to show to the welding [employers] where they really don't care. The industry could care less [about credentials], just so they can do the job. And in the mechanical trades, they don't really care. The manufacturers allow them to have A.A. degrees, but they just want them to have the skills. It's just depending on which particular areas you're talking about. And the reason [the demand for credentials] is high in electronics is because to get the position of technician it is required by the industry to have an A.A. degree. Now when we move into more of the service industry, they won't care.

Some employers did express a *preference* for sub-baccalaureate credentials; that is, an individual with postsecondary education would be hired over an applicant with similar experience without such education; but in cases of such preference, some experience is still commonly necessary. For example, the manager of a credit union in Palmdale said about their management and accounting positions,

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[77] The only other case of requiring an associate degree came in the case of a large Rosefield data processing firm that specifies an associate degree in computer information science for its operators. Of course, certain health occupations require specific community college credentials.

[78] Occasionally an employer will have strong preferences about the source of training. One, for example, reported not hiring individuals who were trained in the military because of their rigid approach to work, while another reported preferring military training because it ensured discipline.

> We'd prefer a two-year degree at least. We have made exceptions if they have previous experience. We will occasionally find someone who is an incredible individual, who has no college background and possibly no experience in the financial industry, but has, say, wonderful interpersonal skills. . . . But we usually don't hire someone with absolutely no experience at all.

Similarly, a human resource manager for a large Rosefield computer manufacturer who claimed to recruit from two-year colleges stated that "community college degrees are desirable, but we look for experience most of all." In these cases it is clear that experience was the basic requirement and community college education an additional benefit rather than the other way around. As the manager of machining for a casting firm commented,

> There was a time we were running three shifts a day, six days a week, and I had two or three guys that had gone through [the local community college]. We didn't look at the schooling as much to hire them as their experience.

Similarly, a recruiter for a temporary agency for drafters and other technical workers in the Rosefield area said,

> We do hire those people [from community colleges]. The more education, the better; the more experience, the better. We don't hire for education alone: Job experience is more significant.

Because employers will give some preference to applicants with community college credentials, such individuals can often make their way into middle-skilled positions by working their way up from relatively unskilled positions—a process we might call (as many instructors do) the "foot in the door" method of gaining access. As an accounting instructor described it,

> [A firm] will hire someone at a two-year level as the go-fer. It's a good opportunity. They see how the business operates and sometimes get to do some drawing. . . . They get some good experience. If they show some aptitude toward drafting, they might get put on the boards. . . . In fact, I've run across a small number of people who have worked up through the architectural ranks over the years, where you can actually become an architectural engineer by putting in an amount of time—eight years for an architect—which qualifies you to take a test, and if you pass that then you can take the licensing test and go on to become an architectural engineer. That's what we typically call working up the hard way.

In this case, initial positions directly after completing a community college program are unskilled; only with "aptitude," experience, and mobility over time do individuals move into middle-skilled positions.[79]

Several employers who acknowledged that postsecondary schooling would give applicants an edge over others indicated that additional education was a signal of greater motivation and persistence, not necessarily an indicator of better technical or job-specific skills since job-specific skills must be more firm-specific, more specific to particular machines, production processes, and firm practices than educational institutions can provide.[80] For example, a production manager for a plastics fabricator praised community college students in terms that omitted any reference to the quality of education:

> Community college students are really good employees. They went to school and they have demonstrated that they have a certain amount of discipline. They have mechanical aptitude. They have interest and desire as well as lots of other pluses.

Similarly, the director of personnel of a glass manufacturer in Rosefield, a continuous-process manufacturing establishment that places a great premium on stability, commented about the range of postsecondary credentials:

> Stability is looked at real seriously. I think a four-year program may be perceived by employers as being more stable than a two-year program: A two-year program may look easy to achieve versus a four-year program. Getting a certificate does not look as though the person has put forth the effort compared to a degree.

Among those employers who expressed some preference for postsecondary education in deciding whom to hire, none of them provides a wage differential for additional schooling.[81] Wage differentials are associated with various jobs—some of which may require baccalaureate or advanced degrees, of course, but not sub-baccalaureate credentials—and most importantly with experience, particularly as experience and job performance get individuals promoted into upper-level positions; but new hires are not given any premium for having additional education or training. Therefore, individuals with community college or other sub-baccalaureate education can increase their earnings by having a greater likelihood of being hired in positions within the sub-baccalaureate labor market, especially in positions with possibilities for advancement and on-the-job training; and their postsecondary education may make them more productive on the job, which will earn them promotion over time. But unlike the baccalaureate degree, their postsecondary education will not in itself move them higher up the salary scale.[82] As a manager in a high-tech firm—an individual who serves on the advisory committee of a local community college—remarked about community college education (and indeed postsecondary education in general):

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[79] This kind of process corroborates the conclusion in Grubb (1992b) and other statistical papers that the benefits of sub-baccalaureate credentials do not materialize until after a number of years of accumulating experience and on-the-job training.

[80] The indications that employers view sub-baccalaureate education as an indicator of motivation and persistence rather than job-related skills is consistent with the statistical results in Grubb (forthcoming-a). These results indicate that certificates and associate degrees (but not baccalaureate degrees) are used as signals of ability rather than of intrinsic productivity. While tests of the value of education as a signal of ability—rather than a way of instilling the cognitive, manipulative, and behavioral capacities that make individuals more productive (as the human capital school has often assumed)—are difficult to carry out, the consistency of statistical tests and evidence from employers suggests that a good deal of signaling does go on in the middle-skills labor market.

[81] Among all the employers we interviewed, there was only a single exception: A large insurance company in Cotooli hires high school graduates into Clerk I and Clerk II positions, while individuals with community college education and associate degrees are generally hired as Clerk III and Clerk IV. (The next step, to Accountant I, requires a B.A. degree.) The unusual differential for community college graduates may be a result

> It comes to the reward that you will get from attending these classes or education. And the answer is zero. You do not get a financial reward for attending any class. You do not get any financial reward for showing proficiency through attendance at educational universities. You do get financially rewarded for performance, which perhaps is enhanced by having a better education. You do get financially rewarded for results, which again may be enhanced by having a broader knowledge of the subject.

However, there is an important caveat to our finding: Because we interviewed employers during a recession with unemployment rates quite high, the hiring standards we heard about were those in force when employers have the greatest choice among applicants. The hiring criteria in periods of expansion and relative shortages of skilled labor are less certain. Several employers did mention that they hired more individuals from

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of the fact that the accounting department in this company was especially rigidly structured—"That's the way the bean counters are," reported the director of personnel. In addition, a large manufacturer of milling machines in Cotooli is considering developing a wage incentive for their workers to take postsecondary coursework—what the director of human resources called skill-based pay—but this practice had not moved beyond the planning stage. Finally, a large manufacturer of milling machines and machine tools in Cotooli claimed that better-educated hires would receive more pay. However, the procedure is that supervisors can request various rates of pay for applicants that they think have various qualifications, and there is no set formula for pay by education levels.

[82] Again, these results based on employer responses are consistent with the quantitative results in Grubb (1992b, 1992 forthcoming-b). These statistical results indicate that individuals earning associate degrees and (for women) certificates do in fact have higher earnings; but they do so by gaining access to positions—particularly professional and managerial positions for men and professional positions for women (Grubb, 1992a)—where they can accumulate more labor market experience and more on-the-job training (OJT). Once experience and OJT are controlled, there are no additional returns to sub-baccalaureate credentials—similar to the finding that there are no salary differentials awarded for sub-baccalaureate education.

postsecondary institutions during the mid-1980s when unemployment rates were lower.[83] Similarly, an employer in Cotooli described how hiring standards varied during periods of surplus and shortage:

> [In the mid-1980s] we got [1800 manufacturing] people from a lot of these companies that had gone down. So we raised the bar [i.e., hiring standards] at that point in time based solely on experience, not on education. Now we've got 1,000 people laid off, so it's '80 and '84 people are going away, and all of a sudden we're going to be down to '79s [where the numbers refer to the year hired in a seniority-based layoff system]. If we ever hire again, and someday we will, I keep preaching that the fertile ground won't be there for these skilled people because by the mid-'90s they will have passed through the system, been retreaded, . . . and then we're going to have to take people with training as opposed to people with experience.

That is, during periods when a surplus of labor in any particular occupation develops, employers base hiring on experience; and they turn to individuals with formal education only when there are relative shortages.

Thus, we can turn the potential limitation of interviewing employers during a recession on its head: We learned about employers' strongest preferences in hiring during a period when they have had the luxury of many applicants from whom to choose. The dominant preference for relatively specific experience over either formal schooling or more general experience should persist into periods of expansion when they have less choice; they may then be forced to hire more individuals with limited experience directly from educational institutions, but such individuals will still be further down in the queue of applicants hired than will those with specific experience.[84] Furthermore, the varied perceptions of community colleges and other education providers should persist into periods of expansion as well. The indifference of many employers towards postsecondary occupational programs and the varied opinions among others reflect more deeply rooted perceptions that expansionary periods may not dispel.

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[83] Very few employers ventured to describe their hiring practices prior to the recession, however: They have relatively short memories, and the small and middle-sized firms that dominated our interviews have no employment policy to refer to.

[84] The conception of hiring from a queue comes from Thurow and Lucas (1972). What remains unclear is whether in periods of expansion sub-baccalaureate education and credentials are given greater preference in hiring than general experience or information from informal job tests and other sources.

Views about Education Providers

We found a wide variety of opinions about the value of community colleges, technical institutes, area vocational schools, proprietary schools, short-term training programs, and the other education and training providers of the sub-baccalaureate labor market.[85] By far the largest group of employers was simply unable to express any opinion about the providers in the local area. They were unfamiliar with local educational institutions; they did not know from which educational institutions their employees (or their best or worst employees) come[86]; they were unable to venture any opinions about which local providers prepared their students the best or about what changes they would make in local educational programs.[87] We interpret this lack of opinion as an indifference to educational providers: Since experience, informal job tests, and probation count much more than educational qualifications in hiring permanent employees and since job-specific skills can be learned in a variety of ways, there is simply no need to be familiar with local educational programs.

The striking exception to the general lack of opinion about educational providers came in Cotooli, where the dominance of the co-op programs places employers and providers in close proximity. There, virtually every employer was familiar both with the co-op programs and with the specific institutions participating. Furthermore, the comments about the quality of co-op education were uniformly positive; the only negative remarks were that—because educational institutions receive the same amount of tuition and state aid for each student—local providers found it difficult to provide enough training in high-cost fields like machining and electronics.

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[85] See Questions 8 through 15 on the employer interview protocol in Appendix A. In addition, some employers ventured opinions but on the basis of experience that seemed quite flimsy. One supervisor who had attended the local community college and who thought that his community college background had helped him get his initial position simply said in support of Frankton Community College, "It helped me, didn't it?" Another individual related a tale of trying to place a job announcement in a college's placement office; finding little enthusiasm, she had washed her hands of the community college without further contact. We have tried to distinguish opinions about educational providers that are based on substantial experience from those based on whimsy.

[86] One electronics instructor in Rosefield complained about employers reproving him about the poor preparation of students from other institutions. The point was that employers could not distinguish among the institutions their technicians had attended and in a synecdochic fashion treated any representative of two-year institutions as responsible for them all.

[87] Occasionally, this occurred because we interviewed individuals at the wrong level of a firm. In some very large firms, where specialization is advanced, hiring is separated from production: Those in charge of hiring do not see how employees perform on the job, and, conversely, supervisors in charge of production do not play a role in hiring. Under such conditions, those in charge of employment have no information about whether their hiring procedures result in productive employees, and it is possible for hiring standards to be inconsistent with skill requirements.

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In two other labor markets—Rosefield and Palmdale—a majority of those employers who expressed any opinions about community colleges and other vocational providers were quite positive. In the Rosefield area, a number of electronics manufacturers hire directly from the local community colleges and several have made an associate degree a hiring requirement. Indeed, virtually all the high-tech manufacturers regard the community college favorably; the only negative comments came from those employing individuals with less technical skills—accountants, business occupations, and the like. In the Palmdale area, only one firm required an associate degree—at the behest of company headquarters in New York—but the general reputation of the community colleges was relatively high even though employers typically did not require community college education.[88]

A minority of employers with opinions about community colleges in Palmdale and Rosefield and a slight majority of employers in Frankton were less complimentary about community colleges. Many castigated educational institutions for using outdated equipment and methods. In some cases, especially machining and electronics, it is almost impossible for educational institutions to keep up with technological changes. As the manager of a machining company in Cotooli explained,

> We took [our apprentices] to [the local technical college] and they asked about their program, and the instructor down there said, "Yes, if you come down here we will teach you how to program a three-axis machine," and one of our apprentices said, "But I'm already programming a five-axis now." [The college] can't buy a Consatti 5-axis machine and the Siemens control on that. That machine is a two million dollar machine, and that's what our apprentices end up learning very soon.

However, even programs not requiring expensive equipment can lag behind; for example, a supervisor of computer operators at a large high-tech firm in Rosefield criticized a nearby community college's computer program because it started with an introductory class that was ten years out of date and then shifted to assembler languages that are not widely used.

In some cases, the internal policies of community colleges rather than the speed and expense of technical advancement are blamed for lags. A number of employers noted the long time necessary to establish new programs and to eliminate obsolete programs, blaming "humungous" educational bureaucracies of colleges and the need for everyone in an institution to approve any changes. In contrast, one reason for the high rating of contract education among employers is that community colleges can usually develop firm-specific programs through their contract education divisions within very short periods of time.

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[88] Because responses to questions about local institutions were both vague and positive about entire institutions rather than specific programs, we suspect that the good reputation of several local colleges for their transfer programs had more to do with their reputation than the quality of their vocational offerings.

A different criticism is that educational programs are too theory-oriented, without sufficient practical or hands-on experience, not specific enough, and not oriented to producing a product.[89] When asked about suggestions for improving electronics programs, a supervisor of a tire manufacturer in Frankton replied,

> Get them more on-the-job training while they're in school because when they come to us they think they're ready to go to work, and they just realize they're just now ready to learn. They've only got half the prescription for success, and the other half is out here dealing with people.

Similarly, in talking about the superiority of the firm's apprenticeship program, the manager of a Cotooli machining company said,

> The difference [between our apprenticeship program and educational programs] is that we base our instruction on real life situations and not on the theory behind it. We bring in actual parts. We bring in actual prints. We talk about real life situations. I don't think you get that necessarily in a school situation.

The director of a large milling company in Cotooli described the problem:

> I don't think the technical colleges necessarily can give the depth of training which can be learned in the industry itself. . . . They take them [students] into a CAD class at [the local technical college] and will teach them some software on how to use computer engine [sic], but I don't think they, along with that, give them the depth of understanding of what they're really doing. They can make the shapes, and they can make the models, and depending on how sophisticated the CAD system is, they'll do a three-dimensional whatever on the screen and do all those kind of nice things that the software does, but unless you are driven by a product, I don't know that it's gained you a whole lot. . . . If you're not working on a product-oriented [process], something that you're going to sell, something that's really got meat to it, that you've got to make money on, it's almost like it doesn't mean anything.

The need, once again, for relatively firm-specific forms of education makes the normal educational programs of community colleges too generic for firms to find them useful. As a manufacturer of pumping equipment in Frankton complained,

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[89] It is difficult to reconcile these complaints about the extraneous education required in community colleges with the emphasis on the need for basic academic skills in the labor force.

> If [my employees] were to take SPC [statistical process control] in a class with a bunch of other people, they're going to learn generic SPC and the instructor is not going to have the time or the knowledge to take them through what we do here on our production line.

In this particular case, the firm had developed an in-house training program to teach more firm-specific versions of general skills; in other cases, contract education has been the solution to providing more specific training.

In a slightly different vein, a recruiter for a temporary agency for drafters and other technical workers complained that

> state-supported community colleges require that students take other subjects such as social science courses. They have to take courses that do not relate to drafting.

Others criticized the inability of community colleges to keep up with escalating requirements of academic skills. The director of human resources for a high-tech manufacturer in the Palmdale area[90] stated,

> I think applicants have the initial list of basic skills. However, those skills apply to what was required five or ten years ago. But because of the development of automation in the factory, artificial intelligence, and SPC and the company direction to use that technique to modernize its production capabilities, the expectation levels for our technicians has moved up. So the bar keeps going up; therefore, it's more difficult to find the standard graduate out of a junior college that meets these goals because the colleges haven't kept up with the expectation of employers.

Even employers who hire extensively from community colleges find flaws in their programs—most often in various nontechnical capacities like communications skills.[91] The personnel directors for an employer near Rosefield—one that has established a co-op program with several community colleges—commented on the quality of community college programs:

> Taking an overall look at the programs, on the technical side, I think they're very good. However, communications skills, both written and oral, aren't up to the same quality. When students are involved in a technical

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[90] This individual was a member of the advisory committee for a local community college's electronics program and reported taking the community college to task for not performing follow-ups on students to find if they found training-related employment.

[91] This corroborates a finding of Hudis et al. (1992), who discovered that employers in health occupations complained about communications skills although the technical skills taught in community colleges are adequate.

> curriculum, they aren't allowed much time to develop other skills even though the general education courses are required, and so the written and oral communications skills don't get developed as they should.

Even within specific labor markets there was substantial variation in opinions about these educational providers. Frankton provides the best example: Those employers who did express opinions about educational providers were divided in their views, with some reporting disappointing experiences while other expressed approval of the local community college. In the Rosefield area, the division of opinion followed occupational lines: Those employing electronics technicians reported that local programs were excellent, and they and tended to require an associate degree; while those employing accountants and other business occupations were generally critical and provided no special recognition of community college credentials.

Where employers were able to compare various educational providers, they tended to prefer institutions on the basis of their equipment—whether it was up-to-date and comparable to that used within the firm—and the similarity of the training to actual conditions on the job, a position which often translated into a preference for educational programs stressing hands-on rather than theoretical training. Indeed, in a few cases employers prefer a shorter, hands-on program to a longer theoretical program. For example, a personnel manager for a Frankton hospital prefers to recruit associate degree nurses from the local community college rather than baccalaureate nurses from the state college "because the A.D.N. at Frankton City College has more hands-on, practical experience, whereas the other side is more theory." Once again, this clarifies that employers are looking for preparation—whether through experience or formal schooling—that is as specific to their own equipment, production methods, and organization as possible.

While it is difficult to interpret the variation in opinion about postsecondary institutions, our best guess is simply that it reflects the variation in the quality of programs and the extent of their connections with employers. Community colleges are notoriously independent and varied—indeed, proudly so because of their rhetoric about serving local communities. State controls over local colleges are relatively weak, particularly in the states where our four labor markets are located. Except in health occupations, where licensing requirements govern, there are neither state nor federal standards for occupational curriculum and no mechanisms like SAT tests that help standardized occupational curricula.

Vocational curricula remain stepchildren within many community colleges where the transfer-oriented curriculum has higher status; and given the lack of follow-up on occupational students as well as the heterogeneity of students' reasons for attending a community college, accountability is virtually lacking. With funding based on attendance, the institutions are more enrollment-driven than outcome-oriented, as we have argued above. In this situation, substantial variation in the quality of occupational programs can persist—and we suspect that this variation shows up in performance and then in employer responses.

Other types of institutions fared less well. Almost no employer had much of an opinion about the short-term vocational programs offered by area vocational schools and adult schools—programs that may offer fifteen-week, half-day courses, for example—aside from one personnel manager in Palmdale who had taken the time to visit several local institutions and who complained about their inability to teach enough in short programs. The public job training programs—JTPA and the JOBS program for welfare recipients—were not used by any of the 113 employers we interviewed; for all practical purposes, these programs are invisible. Nor is the Targeted Jobs Tax Credit (TJTC), which provides a tax credit for the first two years of employment and is designed to cover the costs of training, ever used to hire disadvantaged individuals.[92]

Finally, proprietary schools were almost as invisible. While many secretarial and clerical workers probably got their training through proprietary schools, employers were usually unaware of what institutions they came from. Several proprietary schools, particularly in business areas, came in for harsh criticism. Only two stood out: a technical trade school in Phoenix was highly praised by a number of electronics manufacturers, as described earlier; and one computer networking company in the Palmdale area hired virtually all of their computer operators[93] from a nearby proprietary school "that trains them specifically on the equipment we use." In this particular case, the training is more like that offered through customized training—precisely tailored to the requirements of a single company—than to general vocational education with broad applicability.

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[92] In the sole exception, a manufacturing firm in Cotooli reported hiring a single individual straight out of school who proved to be a worthless employee—"He worked two weeks and was off fifty-two" using the TJTC. In this case, the tax credit was apparently the reason for hiring—"zero [wages] for two [employees]"—but the firm was clearly not going to repeat this dismal experience.

[93] As in virtually every other case, this firm also distinguished carefully between computer operators with proprietary school training and computer programmers who must have baccalaureate degrees and often M.A.s.

The general indifference of many employers to sub-baccalaureate credentials does not mean that education in community colleges and technical institutes provides no advantage to those individuals who pursue it. There are several mechanisms by which such education provides an economic advantage:

- Some employers are impressed with local community college programs and try to hire from them even when community college education is not a requirement.
- Some employers give preference to individuals with postsecondary vocational education over high school graduates with similar experience. While this may happen with middle-skilled occupations, it also occurs with unskilled entry-level jobs—the "foot-in-the-door" process mentioned earlier.
- Associate degrees in electronics and related technical fields are required by some employers, particularly in Rosefield and Palmdale.
- In subjects like health, where licensing standards establish what we have called organized labor markets, community college programs provide access to stable, well-paid careers.
- The co-op programs in Cotooli establish clear mechanisms of entry into these occupations.

However, under other conditions the value of sub-baccalaureate education is uncertain. In particular, the sub-baccalaureate credentials with the greatest economic value—in electronics and related fields and in health—are all in technical subjects requiring math and/or science.[94] The benefits in nontechnical fields—business and accounting, for example—are especially uncertain. Thus, the simple idea that education alone can guarantee access to middle-skilled occupations is clearly incorrect.

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[94] One implication is that individuals unable to go into technical fields because of poor preparation in math and science—which includes many lower-class and minority students and those who did poorly during high school—are effectively precluded from the most lucrative programs.

Promotion Practices

Virtually unanimously, employers report that positions above entry-level jobs are filled through internal promotion. This means, of course, that many positions in sub-baccalaureate labor markets are closed to individuals without experience in particular firms, including new entrants to the labor market and re-entry students.

Almost universally, internal promotion is based on job performance as assessed by supervisors.[95] As in the case of hiring standards, promotion practices are only rarely codified in personnel policies; the small and medium-sized firms are particularly informal.[96] Typically, firms will post notices of opportunities for advancement, and employees will bid for these opportunities. Supervisors will then rank those who have bid for an opening and then choose the "best" applicant based on their record on the job and the match between the skills they have required and those required in the promotion opportunity.

One change from past practice, at least in the labor markets where we interviewed (which tend not to be unionized), is that seniority rarely counts in promotion decisions.[97] The human resource manager in a mid-sized tool and die manufacturer in Cotooli contrasted the current promotion policies as follows:

> [Seniority] was [a factor in promotion] in the past, isn't as much anymore. In the past there was always—you get into the machine skilled-level trades and after you've been there eight or ten years we'll say, "Yeah, you've moved up." Whether or not they've really acquired the skills necessary was academic. I know it's true here [at this company]—what it's gone to now is, if you don't have it, you don't have it. The good old boy network is not going to happen here because we are now in a global marketplace and from a corporate standpoint we are trying to broaden our horizons and diversify our business to get more and more away from the automotive end of the industry and more into other areas. In order to do that, you can't just

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[95] In terms of the theoretical literature on the relation between schooling and earnings, these results support the existence of some weak signaling—the use of sub-baccalaureate educational credentials as signals of motivation and persistence in initial hiring—but not strong signaling in which educational credentials continue to be used as signals of ability in promotion as well as in hiring decisions; see Psacharopoulos (1979). Again, these findings are consistent with the statistical results in Grubb (forthcoming-a).

[96] In all of the firms we interviewed, the single exception to promotion based on supervisors' assessment of performance was a firm in Cotooli that prepares payrolls. In this firm, promotion from entry-level positions to payroll specialist requires passing a six-hour exam that individuals prepare for by going through a series of "training exercises." However, this firm is part of a national corporation with about eighty branches and a great deal of training at company headquarters, and the promotion exam appears to be part of the company's firm-specific training program.

[97] For a case study of several banks indicating the dominance of skill-based promotion over seniority-based promotion, see White and Althauser (1984).

> take—just because Joe over here has been with the company for twenty years but he still breaks the machine, breaks an end-mill every time he tries to square up a block because he's using the wrong tool in the mill—can't really necessarily say, "O.K. Joe, you've been here twenty years, you're a top toolmaker." You can't do that anymore. But years ago that's the way it was.

What emerges consistently—in promotion as in initial hiring—is an image of a world in which competition has squeezed every firm to hire and promote only the most productive individuals, in which all slack has been eliminated. Even if this portrait is exaggerated, it still indicates a renewed emphasis on job performance that might be missing in a world of lesser competition or institutionalized promotion practices (such as those associated with unions).

The dominance of internal promotion and of promotion based on job performance, means that capacities employers cite as necessary on the job—motivation, persistence, cooperation, initiative, flexibility, adaptability, communications skills, the ability to learn new tasks (particularly as technology or work organization changes), and other "foundation skills"—are crucial for long-term success. Employers consistently cite these capacities as more important than job-specific skills—command of machining techniques, for example, or knowledge of accounting principles. This also means that certain capacities which may not be particularly important for entry-level jobs become crucial when individuals are considered for promotion. As the manager of the accounting department of a Rosefield firm explained,

> I've learned coming out into business that one of the things you do more than anything as you rise up in general is that communications becomes the thing that separates people more than anything else, that it becomes the most important skill that you have—maybe even beyond what your technical skills can be. You can be very good technically, but if you can't communicate, that's going to hold you back. So I think that's much more critical than most people understand when you're coming up through school. English is never fun. You think, "I don't need that. I'm going to be a rocket scientist; I don't need to know those other things." But really you do.

While it is difficult to know why behavioral and interpersonal skills should be more important than technical skills, one interpretation is that there is a sufficiently large pool of workers with these skills while there is substantial variation in personal capacities. Another interpretation is that—at least for occupations in the sub-baccalaureate labor market—variation in technical skills above some minimum level is not especially important. That is, given the need to machine a part or produce a drawing or complete certain accounts or diagnose an electronic failure, highly skilled individuals may not be appreciably more productive than those with moderate technical skills since the task is not one where there is much difference between adequate and superior performance. Furthermore, if the timing of production is collective rather than individual, greater facility and quicker execution may not matter either. In contrast, the difference between motivated workers and those who routinely fail to show up or individuals who can perform only one job and those who can shift flexibly among different tasks may be more substantial. While this interpretation must remain speculative in the absence of more detailed ethnographic research, the conclusion remains: Employers in our four labor markets consistently referred to the importance of personal capacities and rarely mentioned job-specific technical skills as especially critical to promotion. Once again, there appears to be a mismatch between those skills which education providers can teach and the capacities that are most crucial on the job.

The need for different capacities as individuals are promoted creates certain difficulties, as the above quotation highlights. The problem for educational institutions and for students concentrating on occupational preparation is that the capacities most necessary for higher-level positions may not be visible and the rationales for taking academic subjects that are "never fun" are unclear. Students concentrating on preparation for entry-level positions—the focus of most occupational programs, after all—and educators asking their advisory committees about the requirements of entry-level jobs may miss the importance of skills required for advancement. Then individuals in entry-level positions in sub-baccalaureate labor markets may lack the skills required for mobility into more advanced positions.

This creates a constant need for upgrade training. However, firms vary enormously in how they accomplish upgrade training and whether they place the burden for upgrading on the employee or whether they assume responsibility for directing certain individuals to improve their skills. In some cases, on-the-job training takes care of the problem—for example, when employees are rotated around different machines or procedures. In other cases, firms send selected employees to vendors—that is, suppliers of new machines or of new computer applications—to learn new skills. The use of contract education, often from community colleges or local four-year colleges, is widespread. Finally, some employers encourage their employees to attend formal schooling—very often with firm-paid tuition subsidies—as a way of upgrading their skills and moving up job ladders, particularly in cases where technology is advancing rapidly and requires computer applications. For example, a manufacturer in Cotooli described the firm's promotion policy in these terms:

> We do not require a person to take x amount of courses before they progress up the job ladder. But we do foster training in education here at [this firm], meaning that in this type of industry the computer age has hit. It's becoming more and more technical to do this kind of work. As we purchase new equipment, we actually send our people to be trained on this type of equipment, build their skills. We encourage and foster their efforts to go out and get outside education. Now, if that person wants to grow and learn about that piece of equipment or grow into another piece of equipment, then he needs to learn more about that to progress ahead.

This kind of procedure places a greater burden on employees to take the initiative for getting additional training. Furthermore, because promotion is dependent on job openings and the skills of other applicants and is not tied directly to educational qualifications, employees in this situation bear some risk because they may gain additional training and still not be promoted. There is, then, some potential disincentive to invest in upgrade training on the part of employees—though no employer complained about problems in finding qualified individuals to promote, compared to the problems they experience in initial hiring.

Because promotion policies are informal and because promotion depends on what opportunities become available, job ladders in most firms are not clearly defined.[98] That is, when individuals within a firm bid on promotion opportunities, the path that they follow will typically depend on what jobs become available, what range of skills they have acquired, and what competition they have from fellow employees at any specific time—and so paths up through a range of jobs of increasing responsibility and pay vary from person to person. There are a few exceptions in the firms we interviewed—the accounting department in a Cotooli firm with a particularly rigid pattern of progression for accounting clerks and several firms governed by union contracts—but the norm among the employers we interviewed is for job ladders to be much more flexible and loosely defined.

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[98] This is a departure from conventional views of internal labor markets in which job ladders are quite clearly defined (e.g., see Doeringer & Piore, 1971, and the introduction to Abraham & McKersie, 1990). The shift to less precise career ladders with much more flexibility in the content of specific jobs is consistent more with the "salaried model" of internal labor markets than with the older "industrial model" (Osterman & Kochan, 1990).

Of course, opportunities for promotion vary: Large firms have more opportunities than do smaller firms; those that have moved to flatter job hierarchies, those that have cross-trained their workforce so that individuals can perform a variety of jobs, and those that have made greater use of temporary employees for entry-level work also have fewer opportunities. For some individuals, mobility can come only by moving among firms once they have accumulated experience within a smaller or less advanced firm, but mobility among firms is difficult because of the tendency for all firms to hire from their existing pool of employees. The consequence is that opportunities for upward mobility and for the growth of earnings that is part of mobility depend in crucial ways on the firm in which an individual gains entry into the sub-baccalaureate labor market.

Employment Trends in Sub-Baccalaureate Labor Markets

Some trends within sub-baccalaureate labor markets are clearly apparent, including the shift to new forms of work organization with wider ranges of responsibility and the adoption of new technologies, including more computer-based processes. However, other changes that emerged in our interviews are more speculative because it is impossible to estimate their magnitude. With this important caveat, we describe several of these potential trends because they may affect the way sub-baccalaureate labor markets operate. Several of them are worrisome because they are detrimental to the individuals trying to gain access to this particular segment of employment, and they suggest the need for intervention into the ways employment is structured.

The Increasing Use of Temporary Employment

Many firms are making greater use of temporary help agencies.[99] Several general respondents commented on this trend, especially in Palmdale where the use of temporary workers is especially high.[100] Temporary workers are used as business ebbs and flows and to cover vacations, medical leaves, and other temporary shortages—what one temporary agency described as the "ideal, true users of temporary services"—but they are increasingly used in other ways. As mentioned above, some firms use temporary agencies to hire probationary workers; and some use temp agencies to perform their recruitment and initial screening so that their personnel departments are not "burdened" with such routine work. In a few cases, employers report that they hire "temporary" workers for relatively long periods of time: A drafting instructor in Rosefield reported a firm hiring drafters on a "temporary" basis for five to six years.

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[99] For statistical evidence of this trend see Abraham (1990). Her explanations for this increase are roughly consistent with ours; there is, however, no firm evidence about which of several possible causes are responsible. For a collection of preliminary papers on what the U.S. Department of Labor (1988) calls "contingent work."

[100] One possible reason is that the Palmdale area has been subjected to especially sharp variation in employment over the past few years and instability in demand may have driven more firms to use temporary employees.

Some firms hire substantial fractions of their employees as temporary workers. One high-tech manufacturer in the Palmdale area typically has about ten percent of its employees in a "flexible workforce," hired through temporary employment agencies and limited in the hours they can work; another, a firm of about two-thousand employees, reported that about one third of their labor force was hired from a temporary agency for "direct labor" like operatives and assemblers.[101] In still another case, again in Palmdale, a representative of a local temporary agency maintains an office full-time at the headquarters of a high-tech company as an "on-site coordinator" in charge of hiring all hourly employees who are hired through the temporary agency and not through the firm itself. All hourly workers then remain employees of the temporary agency:

> They don't sign any contract; they keep working here as long as [the firm] needs them. They could be here for three years and are still our [the temporary agency's] employees; they don't have to be [the firm's employees] to work here.

In this case, the temporary agency has taken over all personnel functions for the firm, at least for particular kinds of workers, including electronics assemblers and secretarial and clerical occupations.

Not only do firms use temporary help as moderately skilled workers such as retail workers, operatives in light industry, and secretaries and clerical workers, but there is a trend to hire more highly skilled workers in this way. One temporary help agency in Palmdale specializes in providing drafters, as does an agency in Rosefield (a "temp agency for technical people"). In another case, an employer laid off a number of engineers who then organized into a firm which does a large amount of consulting with the original employer—in effect converting permanent employees into temporary workers. The practice of hiring temporary workers at lower levels of the occupational structure and the practice of using consultants at the upper levels appear quite similar despite the difference in the status of consultants.

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[101] The employment agency through which this firm hired its temporary workers received a state economic development grant to provide about forty hours of training for these "temporary" employees—a situation which the personnel manager described as "a way that we could get compensated for the training that essentially we were doing anyway." The socialization of training costs is especially peculiar in this case because the fact that the employees were temporary workers meant that they had no job protection or long-term guarantees.

The use of such temporary workers has several advantages to the firm. Most obviously, it reduces the benefits employers must pay. It also allows the firm to fire individuals if they either demand contracts or prove incompetent—without risking a lawsuit or suffering damage to unemployment insurance ratings; and it eliminates any pretense that the firm might be responsible for the individual's professional development through on-the-job training, promotional opportunities, and the like. A few personnel managers claimed that temporary arrangements allow employers to hire outside of affirmative action regulations, since employees brought into a firm as temporary workers can be hired for permanent positions without being counted in affirmative action reviews. The use of temporary workers also fragments a firm's labor force by creating a pool of employees with rights and benefits and another pool of "temporaries" without that status; to the extent that such divisions help employers avoid unionization or deflect criticism, greater use of "temporary" workers may help employers manage discontent.

Unfortunately, there are negative effects for the employees involved. Obviously, they lack the employment stability permanent employees have and they may find it difficult to accumulate the kind of experience that employers value. Temporary employees also seem to lack the same legal protections that permanent employees have, making them more vulnerable to violations of health and safety standards and procedural safeguards.[102] The use of large numbers of temporary workers, particularly at low occupational levels, operates to make entry into the firm more difficult since less skilled entry-level positions are filled by temps with no chance of being permanently hired. For the same reason, the greater use of temps shortens the job ladders within firms.

A labor market in which an increasing fraction of workers are hired from temporary agencies is one in which employment is more likely to be fragmented and intermittent, in which there will be widening inequalities of earnings between permanent and temporary workers, in which fewer workers enjoy legal safeguards, and in which career ladders are shorter. None of these trends bodes well for individuals in the sub-baccalaureate labor market.

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[102] The legal rights of temporary workers are apparently a murky area in employment law. If a firm hires a temporary worker for a relatively long period, then courts have sometimes construed this to be a permanent employment relationship with all the usual legal rights; but this is now being decided on a case by case basis (Oral communication, Erica Grubb, Esq., August 1992).

Inflation in Requirements for "Entry-Level" Jobs

Particularly in large firms, there appears to be a tendency for "entry-level" positions at the sub-baccalaureate level to require higher qualifications, both in education and experience. The tendency to require experience even for relatively unskilled positions like accounting clerks and clerical workers or to require substantial experience among beginning machinists and technicians are examples. As a staff member for the Frankton city economic development agency—an individual well-placed to observe the developments in the local labor market—commented,

> We've got to get employers to hire more people with *truly* entry-level skills. That's sometimes very difficult to do. They say, "I have an entry-level job, but I want them to do—" By the time you get done, this is not an entry-level position. They require more than entry level. I've gone out to a metal fabrication shop and they say, "I want a welder that can weld to the code and a fabricator that knows how to do this and this." They say, "This is an entry-level job." I say, " No, this is not an entry-level job. An entry-level job is where people don't have this expertise already but may have done some welding." I think it goes across industries. You could take it from accounting or anything else, and they really want them to have a greater level of experience or expertise than what they were willing to pay for.

One consequence for individuals trying to enter sub-baccalaureate positions is simply that it is more difficult to qualify for entry-level positions; individuals need more education and, in particular, more experience—returning to the dilemma of how to accumulate experience because most employers (at least the more desirable employers) demand experience as a prerequisite.

The inflation of entry-level requirements is linked in part to the greater use of temporary workers at lower levels, which allows employers to reserve "permanent" employment for higher-skill positions. It may also be a consequence of the 1990-1992 recession, which allowed large firms in particular to have greater choice among applicants—in which case this problem might fade with a period of expansion. However, this phenomenon is linked to educational inflation over the long run, and we therefore suspect it will not abate with an economic recovery.

Shorter Job Ladders

Another discernible trend is the tendency for job ladders—the sequence of jobs of increasing responsibility, possibilities for on-the-job learning and higher earnings—to become shorter. One cause is the flattening of hierarchies within many firms, including the elimination of layers of supervisory workers that previously represented jobs into which production workers might be promoted. The tendency to fragment employment into lower-level, temporary employees and more skilled permanent employees with higher prerequisites for hiring (and fewer supervisory jobs to be promoted into) also contributes to shorter job ladders.

Within the sub-baccalaureate labor market and for those students with sub-baccalaureate credentials like certificates and associate degrees, job ladders are crucial because movement up such ladders is the dominant way of increasing earnings over time and realizing a benefit to postsecondary education (see also the statistical analyses in Grubb, 1992b, forthcoming-b). Shorter job ladders within specific firms therefore imply that upward mobility and earnings increases are limited or that they require a shift to another firm—either one that is larger and has more senior-level positions or one that is more sophisticated in its technology and organization and has greater use for highly experienced or highly skilled workers. But mobility among firms is not necessarily easy, especially given the highly local nature of the sub-baccalaureate labor market and the tendency for firms to promote from within. A labor market with shorter job ladders is one in which upward mobility and earnings increases are likely to be more and more limited.

It is extraordinarily difficult to know whether there are significant trends in the length of job ladders. While some supervisors and personnel managers have a sense of the common patterns of mobility within their firm, their memory is likely to be selective and it is difficult for them to know what dynamic patterns are without analysis of employment records—something employers rarely do. We were unable to interview individual employees who might have been able to give us better information about patterns of mobility,[103] and there has so far been little dynamic analysis of existing longitudinal data sets.[104] However, the available circumstantial evidence suggests that job ladders have been getting shorter, leading to a concern that in the future individuals in the sub-baccalaureate labor market will have fewer opportunities for advancement and earnings gains.

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[103] Even this may not be true. In another set of interviews of community college entrants and dropouts, we have attempted to collect information on the sequences of jobs and education since high school graduation. This has proved impossible to do in a majority of cases simply because these individuals' recall is limited. This implies that the only way to collect information about a sequence of events is through periodic interviews—as has happened with several longitudinal data sets, notably the National Longitudinal Study of the Class of 1972 (NLS72) and the National Longitudinal Survey of Youth (NLS-Youth).

Educational Inflation

The inflation of educational requirements for occupations has been going on for some time (Archer, 1982). A staple of the literature on the irrationality of educational requirements is the showing that the educational *qualifications* of individuals in specific occupations have consistently been higher than the educational *requirements*—a situation of "over-education" that results in higher educational requirements than necessary and in declining marginal returns from formal schooling (Rawlins & Ulman, 1974; Rumberger, 1981). The evidence from our interviews suggests that this process is continuing to take place in the sub-baccalaureate labor market, particularly as some jobs come to require baccalaureate degrees and become out of reach of those with a high school diploma and perhaps some postsecondary education. For example, positions as computer programmers—as distinct from positions entering data and using applications like spreadsheets—now require B.A. preparation; most firms require baccalaureate degrees for their managers; and positions that were once filled by electronics technicians now require B.A.-level engineers. The result is that some community college programs are simply being bypassed. As the director of human resources for a semi-conductor manufacturer in Palmdale explained it,

> I can remember hiring people out of [a local community college] twenty years ago and hanging out at the job placement center doing interviews because that was the only place to get [electronics technicians]. Now we're going to Palmdale State College to get the engineers because that is what it takes to keep things going because the sophistication of the equipment has gotten so hot, it takes an engineer to keep it mothered. And the electronics technicians, if they haven't kept up, they just can't compete.

This does not mean that the sub-baccalaureate labor market is shrinking as some jobs come to require baccalaureate degrees; indeed, the evidence—presented in the introduction—is that this segment is expanding substantially. Rather, the problem is that the best jobs in the sub-baccalaureate labor market are coming to require baccalaureate degrees and are being replaced by lower-quality jobs that previously required only a high school diploma—for example, positions as secretaries, clerical workers, and accounting clerks for which employers now give some preference to postsecondary education.

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[104] However, see Klerman and Karoly (1992). Norton Grubb and Jacob Klerman plan to begin a longitudinal analyses of the NLS72 and the NLS-Youth data in order to investigate the dynamic patterns that have so far eluded analysis.

Thus, educational inflation takes place in the following way: As educational requirements in general increase, the highest education levels have larger fractions of employees in them, while the lowest levels (e.g., employment for high school dropouts) have smaller fractions in them. In between—in the sub-baccalaureate labor market—there is a constant process of shifting the best occupations to individuals with baccalaureate degrees and replenishing them with lower-quality jobs even though the size of this segment may be increasing. This process is an unavoidable consequence of being betwixt the highly skilled labor market and the unskilled market occupied by high school dropouts.

These changes may be taking place not as a result of "over-education"—educational qualifications outpacing educational requirements—but as a result of changes in work organization and technology requiring more of workers. However, from the viewpoint of individuals—and particularly the "nontraditional" students (including those in need of retraining) who may find their way into community colleges but not four-year colleges—it matters little why educational requirements are escalating. It matters only that the better-quality occupations are increasingly difficult to enter as educational inflation continues to take place.

The Emergence of Customized Training

There is little doubt that customized training (or contract education) in the sub-baccalaureate labor market has expanded substantially in the past decade. Virtually every community college now offers customized training, and some institutions have substantial enrollments and derive considerable unrestricted funds from providing customized training (Lynch et al., 1991; on the expansion of formal firm-sponsored training, see Bowers & Swain, 1992). In some communities—especially Rosefield and Frankton—much of the positive image of community colleges among employers has been generated by contract education.

Contract education is a response to several trends that have been widely noted: the increasing skills needed in some occupations, the need for cross-training as work is reorganized, and the need in many cases for remedial education or ESL. It also fits the desire of employers to promote from within and provides an opportunity for training specifically tailored to the conditions of a particular firm. From the perspective of educational institutions, contract education provides another way in which community colleges can serve their communities and build relations with employers, so it appears to have advantages for all participants.

However, the dark side of customized training is that it may reinforce a two-track system of work-related education and training in which contract education programs thrive while "regular" vocational programs suffer from relatively distant relations with employers and low placement rates and in which those already employed have access to further training while individuals in initial training and retraining programs have a harder time breaking into the sub-baccalaureate labor market. The possibility of such a division provides yet more reasons for educational institutions to be concerned about their connection to employers—a subject to which we will return in the final section.

HOW WELL DO SUB-BACCALAUREATE LABOR MARKETS WORK? CONCLUSIONS AND RECOMMENDATIONS

This country has often turned to formal education to improve its economic conditions—to eliminate poverty, redress inequities, enhance overall economic growth, and increase our competitiveness. The recent national reports bemoaning the decline of the American economy have been part of this much longer trend of emphasis on schools and colleges reforming before the country can become competitive or shift to a "high-wage equilibrium."

Such claims on schools and colleges are almost certainly exaggerated because they fail to address the many other causes of economic rise and fall—including the role of business decisions, international flows of capital and investment, the influence of our national deficit, the relatively small role of government in directing economic policy in this country, and the influence of American culture on the propensity to save and invest. To blame formal education for the decline of our economy or to emphasize the reform of education as the key element of economic recovery is at best misleading and at worst a romantic fantasy that might improve education but fail to enhance economic conditions at all. Given the many other influences on economic growth and competitiveness, some modesty about the claims made for and against schooling seems appropriate.

Still, even without exaggerating the claims about education's influence, on its own terms formal schooling plays an important role. Individuals look to education as a mechanism of their own personal advancement, and the educational institutions serving the sub-baccalaureate labor market—community colleges and technical institutes, area vocational schools, a few adult schools, and some proprietary schools—have been particularly important for a broad range of individuals seeking entrance into the labor market. These institutions have also been more flexible than four-year colleges, responding to the need for retraining for those switching occupations, upgrade training for those needing new skills, and remediation as well as initial training for the sub-baccalaureate labor market. Employers, too, have counted on the schools for at least some of the skills they require. When the relationship between schooling and employers works well—for example, in what we have termed "organized" labor markets like health occupations or in the co-op programs of Cotooli—the congruence between education providers and employer requirements and the benefits to students and employers alike suggest an ideal that serves all those involved.

We can, then, judge the effectiveness of sub-baccalaureate labor markets simply by asking whether they work well in their own terms, in fulfilling the expectations potential employees and employers have. In this section we summarize the evidence from the previous sections and end with a series of recommendations intended to address the most obvious problems within the sub-baccalaureate labor market.

Effectiveness for Students

Increasing enrollments in community colleges and technical institutes indicate the continuing appeal of these institutions to a broad range of individuals with a variety of purposes. For those who think that students "voting with their feet" are well-informed about the prospects before them and are evidently making the decisions that are right for them, burgeoning enrollments are a sign of success. However, there are several reasons to remain concerned about the effectiveness of these institutions in providing access to sub-baccalaureate labor markets.

One obvious problem is the lack of information, for students and institutions alike. We uncovered very little information about the experiences of students in these institutions—about their rates of completion, their placement in positions related to employment, their earnings in the short term and the long run—with which students could make reasoned choices among alternative programs and alternative institutions. Community colleges and technical institutes do not collect such information—or occasionally, they collect it in such a way that its validity is highly suspect. Most employers are unable to provide even the most primitive guess of which local institutions are best and worst, save in some cases within Cotooli where employers have evaluated several institutions in setting up co-op programs. Although there may be a good deal of informal information at the local level—for example, in the generally high reputation of some community colleges or in statements like "everyone knows that XYZ College has a good electronics program"—the quality of this information is mediocre because reputations are imprecise, memories are selective, and information about occupational success over time as individuals move from job to job is almost completely lacking. As a result, potential students cannot get the information they need to make rational decisions about the different occupational areas and the institutions among which they can choose. While we have no direct information about the ways they make occupational choices, we can only surmise that they make many of their decisions serendipitously.

The problem of poor information emerges in several specific practices. One, highlighted by comments of employers about the unrealistic expectations of students, is that many students underestimate how difficult it is to enter the sub-baccalaureate labor market: The requirement of experience rather than (or in addition to) formal education, the fact that entry-level positions are poorly paid and relatively unskilled, and the period of time and performance required for moving up job ladders are all characteristics of sub-baccalaureate jobs that are not widely appreciated. A second problem comes in the mismatch between the offerings at educational institutions and the realities of the jobs that are available: The disjuncture between the large programs in business occupations and the fact that very few employers have positions suitable for such amorphous preparation and the fact that computer science and accounting programs in community colleges generally prepare individuals for clerical rather than professional positions are two obvious examples. Still another difficulty comes in the uncertain advantages of sub-baccalaureate credentials: The many employer comments about the fact the credentials alone will not get anyone hired—except perhaps in "organized" labor markets like the health professions or in areas like electronics where some employers have made the associate degree a prerequisite—corroborate statistical information about the varying returns to certificates and associate degrees. Many community college programs are outdated or are perceived by employers as too theoretical—but they still attract enrollments from students who cannot know how employers perceive the preparation in such programs.

Still another problem emerges in the kinds of programs students put together in educational institutions. With few exceptions, short-term job training programs—those lasting eight to sixteen weeks, for example, and provided by area vocational schools for adults and by JTPA and JOBS programs for welfare clients and other disadvantaged individuals—were virtually invisible to the employers we interviewed. They do not hire from these programs particularly because they are concerned that the individuals in them have deficient basic skills. Neither do they tend to hire individuals with small amounts of community college education except when they are looking for specific capacities—knowledge of a particular spreadsheet program, for example, or experience on a specific type of machine. Their ideal employee is one who has a range of abilities—specific job-related abilities (including the variety of skills required of flexible workers), sufficient related academic (or basic) skills, as well as the personal characteristics related to motivation, teamwork, and the like. It is therefore difficult to see how just a few postsecondary courses—the kind of programs many students construct when they enroll in a community college for just a few courses but in which they do not complete a certificate or associate degree—can provide much benefit or can provide entry to more than the lowest-level, routinized work. Indeed, those employers that do hire directly from community colleges rather than looking for experience almost uniformly require the completion of programs—in positions as electronics technicians that require associate degrees, in the health occupations requiring completion of a specific program, and in the co-op programs in Cotooli. We continue to think, therefore, that completion of coherent programs, rather than of individual courses, is important in the sub-baccalaureate labor market.[105] However, with a few exceptions,[106] community colleges have not established the mechanisms that would push students to complete coherent programs. As the director of the placement center at a prominent community college in the Palmdale area said,

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[105] The statistical work in Grubb (1992b, forthcoming-b) corroborates this conclusion, though Kane and Rouse (1992), relying on results about wage rates rather than annual earnings, are more optimistic about the benefits of individual course-taking.

> We have so many students here that are just sort of wandering, taking classes without any sort of cohesive plan to those classes—a hundred years at [this college] that leads to nothing. And it's like they say, "Well, nobody told me"—well—what they need to do.

Despite these problems, it is still incorrect to say—as some critics of community colleges have claimed (e.g., Brint & Karabel, 1989)—that educational providers in the sub-baccalaureate labor market are worthless. From our interviews, it is clear that some employers have established prerequisites for associate degrees, especially in electronics; occupations in organized labor markets like health care require sub-baccalaureate credentials; some employers prefer applicants with a combination of experience and postsecondary education; and others interpret postsecondary education as an indication of persistence and determination, giving an edge in an increasingly competitive labor market to those who have attended community colleges and technical institutes. The limited statistical evidence also corroborates the value of such education. The problem remains, however, that these advantages are varied and uncertain: They are more substantial for associate degrees than for certificates, more substantial for completed credentials (i.e., coherent programs) than for a few courses, more substantial for health and technical fields than for other occupational areas, and more substantial when individuals find related employment. No doubt they vary in many other ways which have not yet been investigated. From the viewpoint of students deciding where to enroll or administrators trying to identify weak programs to improve, information should be much more detailed than is now available.

Effectiveness for Employers

Given the responses of the employers in our four labor communities, the most serious deficiency of the existing educational system is the preparation in basic academic skills—math, reading, and writing—of new employees. The volume of complaints about basic skill deficiencies has been deafening, and the anger and bewilderment of employers finding themselves with unprepared employees is unmistakable. As we have seen, employers often lump together cognitive skills with motivation; persistence; the ability to work cooperatively; and other personal characteristics that are more difficult for educational institutions to impart in the way they teach reading, writing, and arithmetic. Still, the

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[106] For example, Miami-Dade Community College has established a student tracking and warning system to encourage students to complete the programs they establish for themselves (described in Roueche & Baker, 1987, Ch. III) and California has developed a system of matriculation intended to promote completion.

deficiencies in basic academic capacities are unmistakable and for many employers constitute the most serious threat to the future of the labor force.

A second problem with the effectiveness of the current education system for employers is simply that employers do not rely on it much. Overwhelmingly, where they have choices, they hire on the basis of experience, and preferably experience specifically related to their own production methods and processes. In part, this occurs because of the enormous variation among firms in the nature of production, making it impossible—as some employers acknowledged—for any educational institution to provide specific enough training to satisfy any particular firm.[107] In part, the reliance on experience reflects the value they place on motivation, persistence, interpersonal skills, and other personal characteristics which are better reflected in job histories than in formal schooling. In part, the reliance on experience rather than formal education suggests a fundamental mismatch in the sub-baccalaureate labor market: Community colleges and technical institutes are busy developing technical skills in their occupational programs while employers are looking for quite different characteristics when they decide whom to hire. Again, the exceptions to this pattern come in organized labor markets like health occupations, in occupations like electronics where community college preparation has become common (at least in some labor markets), and in co-op programs like those of Cotooli—all special circumstances that could be extended to a broader range of occupations.

A third problem for employers in the sub-baccalaureate labor market is that the incentives that education providers face are inconsistent with the incentives employers can provide. Community colleges and technical institutes provide programs and courses when their marginal benefits—state reimbursements and tuition—exceed their marginal costs. Therefore, programs with high costs are more difficult to expand than are low-cost, high-demand programs—ESL, for example—and programs in high demand by employers will still not operate if *student* demand does not materialize—as happens with low-status programs like machining, for example, or with poor information about long-term benefits.

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[107] There is a conventional economic argument that public institutions should not provide such specific training but should provide only general education that individuals can use in many jobs, including the basic academic skills which appear to be so deficient (see Becker, 1975, Ch. 2).

Thus, shortages in particular occupations can materialize because education providers are enrollment-driven rather than demand-driven.[108]

A somewhat different kind of mismatch between demand and supply involves the timing of decisions. Employers complain about the sluggishness of educational bureaucracies and about their inability to change educational programs to keep up with changing technologies and changes in the mix of occupations. Community colleges also complain that employers do not provide them the right information or could not forecast their employment needs adequately or kept their employment requirements secret for competitive reasons. While there may be blame on both sides, then, the fact remains that the sub-baccalaureate labor markets cannot respond to changes very well unless employers provide the relevant information and educational institutions respond in reasonable periods of time.[109]

Other complaints about education providers focus on the obsolescence of education and equipment. In a period of rapidly changing technology, it may be impossible for community colleges to afford to change their equipment to keep pace with employers, and a cooperative program may be the only solution. But in other cases, obsolescence seems to be caused by educational institutions failing to keep abreast of changes in work, and closer relations between employers and providers would be appropriate as mechanisms of information sharing.

There are, then, several ways in which the supply of skills to the sub-baccalaureate labor market is inconsistent with demand by employers. With some exceptions—the cases of electronics programs which are widely used by employers, organized labor markets like health occupations, and the co-op programs prevalent in Cotooli—the dominant image is that of two nonintersecting worlds in which providers of education and training and the employers of sub-baccalaureate jobs have little knowledge of each other.

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[108] There are other complaints about shortages that appear as a result of employer policy rather than educational institutions: The complaints about shortages of machinists—where employers pay little more than the minimum wage for entry-level machinists and where layoffs over the business cycle are common—are good examples, where students do seem to respond rationally to the lack of long-run benefits within this occupation.

[109] The problem of response time is also a problem in baccalaureate-level labor markets, of course, since it takes so much time to educate a cohort (see Freeman, 1971). This kind of lag should be less serious in the middle-skilled labor market since programs take one or two years rather than four years or more.

Effectiveness in Responding to Changes

In several ways already mentioned, responding to changes in the sub-baccalaureate labor market—for example, sectoral changes as demand fluctuates or changes in work requirements as technology or work organization shifts—is sometimes difficult because of the inconsistency of incentives between providers and employers because of lags in the decisions of educational institutions, and because of inadequacies in the information available to potential students. Many of these lags can be reduced by efforts to strengthen connections between employers and educational institutions, as described in the recommendations below.

However, there are still other problems in the process of adjustment in sub-baccalaureate labor markets, some of which cannot be readily reformed. One of these stems from the local nature of sub-baccalaureate labor markets. The local focus of both those searching for employment and of employers means that occupational shortages can occur in a particular region while there are surpluses nearby since the mobility that might otherwise eliminate both shortage and surplus is unlikely to take place or takes place only slowly. One implication is that sectoral and occupational changes involving geographical relocation require more time than they would if sub-baccalaureate labor markets were not so local or than they would in the markets for baccalaureate-level individuals operating in regional and national labor markets.

Another difficult problem involves the cyclical variation in the sub-baccalaureate labor market. The periodic recessions in sub-baccalaureate labor markets (including the period of this study), during which there are very few hires, reduce the incentives for individuals to invest in lengthy training. (This problem is exacerbated, as we saw in the case of machinists, when the period of on-the-job experience required to move into positions of substantial responsibility and earnings is relatively long.) This aspect of cyclical variation may be further reinforced by the tendency for enrollments in community colleges and technical institutes to increase during recessions, leading to more students precisely when the labor market is unable to absorb them. As in the case of the local nature of the sub-baccalaureate labor market, it is difficult to know what to do about cyclical variation,[110] but it remains an issue whose effects need to be considered.

Recommendations: The Responsibilities of Providers and Employers

One clear advantage of examining several different local labor markets is that it has been possible to detect both strengths and weaknesses. Some problems in sub-baccalaureate labor markets appear to be present in all local areas—the problem of inadequate basic skills, for example. Others—like the weak connections between educational providers and employers—are present in some local areas (notably Frankton) and in some occupational areas in other labor markets (e.g., business occupations, accounting, and drafting in Rosefield and Palmdale) but are strong elsewhere, notably in some electronics programs and in the co-op programs in Cotooli. The varying responses, across different labor markets and occupations, provides some basis for recommendations. In particular, we see five areas in which there is need for reform.

Basic Skills, Remediation, and Academic Content

The employers we interviewed added their voices to a swelling chorus lamenting the sorry state of basic skills—reading, writing, and simple arithmetic. There are, of course, many reform movements now attempting to reform secondary schools—for example, to attempt new forms of teaching; to restructure schools; and to provide more focus to high schools, including more occupational focus (Andrew & Grubb, 1992; Grubb, Davis, Lum, Plihal, & Morgaine, 1991)—with the potential for improving the quality of high schools. There is a role *employers* can play in these efforts in clarifying to students the disastrous consequences of failing to master basic competencies during high school. What was most compelling in our interviews with employers was the fervor of their comments about basic skills and their convincing portrayal of an increasingly competitive world in which individuals without basic skills stand no chance of ever entering careers with increasing responsibility and pay. This state of the labor market needs to be communicated to students since it is clear that their expectations about the work world are frequently uninformed and unrealistic.

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[110] There have been proposals for counter-cyclical training where instead of laying off workers during recessions, firms use the slack time for retraining. In some sense, some counter-cyclical training does take place when workers are laid off and then enroll in postsecondary institutions for retraining—but this approach destroys the connection between employees and specific firms, wastes the specific human capital accumulated by workers in firms, and places the entire burden for funding counter-cyclical training on employees.

Among postsecondary institutions like community colleges and technical institutes, remedial education (sometimes termed developmental education) has increased enormously, in some cases threatening to take over all other purposes. However, remediation has never been given the stature or the resources or the attention to effectiveness that other aspects of education have had. The result is that while remedial programs in community colleges appear to be more effective and innovative than they are in adult education, turnover is still high and effectiveness largely unrealized (Grubb, Kalman, Castellano, Brown, & Bradby, 1991). Given the volume of complaints by employers about the individuals in sub-baccalaureate jobs, it is clear that the occupational functions of community colleges—their roles in initial training and retraining—cannot be successfully fulfilled unless they remedy any basic skills deficiencies their occupational students have. In turn, this probably requires experimenting with different teaching methods, including methods of providing basic skills instruction within the context of occupational programs.

Within occupational programs themselves, a clear implication of employers' complaints is that an emphasis on technical or job-specific skills is inadequate. Aside from problems related to outdated equipment and methods, the dominant complaint from employers is not that community college students need more job-specific skills but that they lack more general competencies—especially communications skills and problem-solving abilities—necessary to move from entry-level jobs to more responsible positions. There are many ways of integrating more general and more "academic" competencies into occupational programs (Grubb & Kraskouskas, 1992), but such integration needs to be considered central to occupational preparation, not peripheral or secondary. In a world where production requires a greater range of responsibilities among employers, technical job skills are not enough—and those who have only technical skills will be relegated forever to entry-level work.

The community of employers is sometimes ambiguous about this point. At the same time that the vast majority of employers complained about deficiencies in basic skills and certain "foundation skills," a substantial number in our sample castigated educational institutions for including academic requirements that they consider unrelated to work—general education requirements, for example. They seemed ready to strip occupational programs of any elements not narrowly job-related, and they praised the specific focus of customized training. But general education and other "academic" requirements may be precisely the places where students best learn more general competencies even though there are many ways in which the relationship of such courses to employment-related competencies could be clarified. If employers as a whole find their employees deficient in certain general competencies, they need to support the efforts of educational institutions to develop broader occupational programs, not criticize the inclusion of elements that seem irrelevant.

Information in the Local "System"

A second area for reform involves improvements about the options available to prospective employees and the consequences. The dearth of information among educators and policymakers, the frequent comments about the unrealistic expectations of new entrants into employment, the large amount of "milling around" in community colleges, and the evident mismatch between some community college programs (e.g., in business occupations and computer applications) and the reality of the occupations available suggests that there is insufficient information for students to make rational decisions. An obvious recommendation is for local institutions—prodded by state and federal policy where appropriate—to take steps to improve the information available to students considering jobs in sub-baccalaureate occupations.[111]

There are, of course, many ways to improve the information now available. One would be to collect better information about the short- and long-run employment effects of different local programs and make that available to students through, for example, placement offices—very different from and much more active than current placement offices—within specific educational institutions. Another would be to establish community-wide information centers with state and federal support that can provide information on the variety of education and training programs in a community, not just those in a specific institution. These might be like the local Employment and Training Boards proposed by *America's Choice* (Commission on the Skills of the American Workforce, 1990, p. 87) that would have a variety of planning and coordinating responsibilities in addition to information provision. Still another possibility would be to establish special-purpose information centers whose mission is to act as advocates for prospective students, providing them information about the alternatives available unburdened with other administrative responsibilities that might shade the information they provide individuals. While each approach has advantages and disadvantages, any way of increasing information would be a substantial improvement over what now exists, where anecdote and ignorance prevail.

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[111] Of course in truly depressed labor markets, better information will not increase the employment opportunities available. However, as economic conditions improve, good information becomes more important in allocating individuals to occupations of greater demand. More information is always useful to administrators deciding what programs are most needed and to students trying to avoid ineffective programs.

Strengthening Connections to Employers

We found the connections between postsecondary education institutions and local employers to be highly variable. In some cases—particularly the technical and community colleges near Cotooli—they were extraordinarily close; almost all employers were familiar with local institutions and several had carried intensive examinations of which were best suited to their needs. In other cases—Frankton being the best case—the local community college is simply fooling itself about its image in the local employer community. Such variation is to be expected, of course, given the wide variety of labor markets and of ways in which community colleges practice; but the occupational programs in institutions with poor connections to employers can only accidentally provide their students with entry into middle-level occupations.

Each of the ways in which educational institutions can be connected to employers merits separate scrutiny:

- *Advisory committees* in some institutions meet infrequently at an institution-wide level and cannot provide anything more than simple public relations; in other community colleges, they serve as important conduits for information from employers to particular programs. Improving the nature of advisory committees is not especially difficult, though it requires both time and an orientation to the external community that some institutions may not be able to muster.

  However, even the best-structured advisory committees are beset by certain structural problems and therefore cannot be—as they are in many community colleges—the principal or the only form of connection to local labor markets. The information provided by employers is sometimes often inaccurate because of which individuals serve on committees; it is sometimes inadequate when firms are unwilling to reveal their plans or simply not useful when firms are unable to plan their own hiring very far in advance. Unlike the establishment of co-op programs, where the relationship with employers has a specific goal and the employer must commit certain resources (co-op placements), the work of advisory committees is often amorphous. One solution is to develop advisory committees committed to specific tasks—for example, modernizing a curriculum or collecting local follow-up studies or assessing which general or "foundation" skills are in short supply or developing a certification of occupational skills—in which both employers and the educational provider have a stake.

- *The placement function* has been neglected in most community colleges, which continue to think of themselves as educational institutions and not placement bureaus. That characterization is inadequate partly because students seeking entry into the sub-baccalaureate labor market require information as well as job-related skills and partly because a well-operated placement function can provide information to the institution about the strengths and deficiencies of its occupational programs. Strengthening placement—whether through a placement office, through the placement efforts of individual faculty, or through an external agency like a local employment and training board—requires a much more active approach to collecting information about job openings and certainly requires a shift in focus away from the kinds of part-time, "stay-in-school" jobs now emphasized in most placement offices. The experience of other programs, especially the job development efforts of programs like JTPA and JOBS, provides another model of how stable relations with employers can be developed and both improve the placements rate of completers and provide additional information about job requirements.

- *Student follow-up and tracking* is virtually nonexistent in most postsecondary institutions, and the result is that most community colleges and technical institutes know virtually nothing about what their students do and, therefore, about whether their occupational programs are successful or not. The prevalence of anecdote and fable is nowhere more apparent than in the answers to questions about what students do when they leave these institutions. Furthermore, the absence of such information leads to problems elsewhere; for example, it is difficult to provide better information to individuals about their options in sub-baccalaureate labor markets without data from tracking students.

There are several federal initiatives that may promote better and more comprehensive follow-up mechanisms, especially the performance measures of the Carl D. Perkins Vocational Education Act and the placement rates that will be required by the Student Right-to-Know Act. However, such efforts ought also to be undertaken by local institutions and through state policy. The development of low-cost methods of tracking students through the unemployment insurance system (Baj et al., 1991) should make the development of such information easier and more accurate. The intent need not be punitive (e.g., the closing of nonperforming programs) but rather supportive of better quality, increasing information about performance so that institutions can improve their programs and strengthen their connections to employers where placements are low. In turn, this information will benefit prospective students as well and improve our understanding of sub-baccalaureate labor markets by examining where placement rates and earnings are high and low, how employment effects vary from region to region, how consequences vary over the business cycle, and how trends in the sub-baccalaureate labor market affect students entering through educational institutions.

- *Contract education* is booming in most areas, and community colleges have profited by the increased attention to the skills of subprofessional employees. However, when contract education is isolated from the regular vocational offerings, the additional contacts with employers cannot benefit the regular programs where the bulk of students are enrolled. The possibility of developing a two-track system in which contract education is responsible for the high reputation of educational institutions among employers and provides mobility for those who have managed to gain access to firms investing in continuing education while the regular programs remain distant from employers and provide uncertain access to middle-level jobs and careers is particularly dangerous. While many institutions have consciously established contract education independent from occupational departments, they need to reconsider the advantages of a tighter integration.

- *Co-op programs* appear to be the single most promising practice in linking education providers with the sub-baccalaureate labor markets. Because of the needs of employers and educators to cooperate in setting them up, they improve the connection between the two sides. They also resolve a number of barriers to employment in sub-baccalaureate jobs: They provide both job-specific and general forms of education; they provide some job-specific experience without which it is virtually impossible to be employed; they provide employers information about the motivation, persistence, and other personal characteristics that they value so much at the same time that they clarify to students why such characteristics and other "foundation skills" are crucial to long-run success. The contrast between the reactions of employers in Cotooli, who are almost unanimously knowledgeable about and supportive of local educational institutions, and those in other labor markets, who are generally indifferent, was the most striking consequence of co-op programs. The benefits of co-op programs to all parties—to students, education providers, and employers—seem so substantial[112] that expanding them should, in our view, be a priority of educational institutions wanting to improve their performance.

The Cotooli experience clarifies that co-op programs need to be carefully structured, so that a "high quality" equilibrium of good jobs and able students emerges rather than the low-quality jobs which have sometimes given work experience a bad name.[113] But the developments in Cotooli also indicate that high-quality co-op programs can persist without a complicated institutional structure once employers and providers are educated about the characteristics of good programs. Such programs require substantial participation by employers as well as community colleges and technical institutes and therefore place responsibilities on employers that they may find novel. But if they complain about the quality of potential employees they find in the sub-baccalaureate labor market, the benefits to them should be substantial enough to outweigh any misgivings.

- *The emphasis on enrollment* within postsecondary institutions caused in part by funding formulas and in part by tradition partially undermines their commitment to outcomes, including employment consequences. Enrollment-based funding also makes it difficult for them to support high-cost programs even though these may be areas of substantial demand. A greater orientation to outcomes may be imposed on these institutions by the accountability movement; the clearest federal expression of this trend is the requirement of performance measures in the Perkins Act, though a few states (like Florida and Ohio) have formulated their own policies. Any developments that can turn these and other institutions to a greater concern with outcomes will help strengthen connections with employers.[114] In turn, it may be necessary to shift to funding mechanisms which consider variations in program cost, as well as outcomes.

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[112] A caveat is necessary: While reports from educators and employers in Cotooli are favorable, we know little about the benefits to students of these programs. In addition, we know nothing about students *not* in co-op programs who may find themselves completely unable to gain access to certain jobs.

[113] For example, Arnold (1988) shows that limited or repetitive work experience can actually harm a student's later success.

Organizing Local Labor Markets: The Role of Skill Standards

Aside from co-op programs, the other close relations between employers and education providers occur in what we have called organized labor markets like health occupations where licensing provisions spell out the preparation required. These requirements then organize the labor market on both the demand and the supply side—that is, they are binding on both providers of education like community colleges and on employers like hospitals; and they therefore impose a consistency in the skills required and taught. The problems that emerge in other occupational areas—in business occupations, for example, where education programs do not match an identifiable set of jobs, or in machining, where very specific training and considerable experience are usually necessary—do not occur, and individuals who enter health occupation programs are much more likely to move into jobs related to their training and into positions with prospects for advancement. A further benefit is that the process of formulating such requirements forces employers and providers into closer contact with a prescribed task (like the specific task required in establishing co-op programs but unlike the amorphous responsibilities of advisory committees).

Within the sub-baccalaureate labor market, there are not many examples of such organized labor markets except in health occupations. However, the proposals (e.g., Commission on the Skills of the American Workforce, 1990; SCANS, 1991) to establish skill standards for occupational areas are functionally equivalent to the licensing requirements of health occupations. While skill standards have often been proposed as a way of enhancing the capacities of employees, they have just as much value as devices for organizing sub-baccalaureate labor markets. An obvious recommendation, then, is that postsecondary educational institutions and local employers should participate in developing skill standards as a way of coordinating their efforts and increasing their contact, creating some coherence out of the chaos and inconsistency that now reigns in many sub-baccalaureate labor markets.

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[114] This statement needs to be qualified, since—as the JTPA experience clarifies—some performance measures strengthen *inappropriate* connections with employers. Within JTPA, the thirty-day placement and the cost-per-placement standards have led some local programs to emphasize on-the-job training of questionable value and short-term placements to the neglect of long-term gains.

The Responsibilities of Employers

The conventional analysis of our current economic malaise points to declining productivity, declining real wages, diminished competitiveness with other countries, and other declining measures of economic well-being and goes on to identify weaknesses in the labor force as responsible. The solutions, then, emphasize a series of reforms that need to take place in education institutions. Even those few analyses that blame employers in part for the current economic conditions generally fail to suggest what reforms are necessary in the business community to restore competitiveness. For example, *America's Choice: High Skills or Low Wages!* (Commission on the Skills of the American Workforce, 1990) clarifies that employers have structured a great deal of employment so that it requires very limited skills, clarifying that any change to increase competencies through educational institutions may have little effect because the jobs which require substantially greater skills do not now exist. But the obvious corollary—that employers must change the nature of employment—receives much less attention than a series of recommendations to reform schools.

However, in examining sub-baccalaureate labor markets, it is clear that employers can easily undermine any changes that schools and colleges make through their employment policies. For example, Frankton providers were frustrated that their efforts to shift to computer-based instruction in drafting and accounting were thwarted by employers who have not yet adopted computer-based methods; the lack of any education- or skill-based pay differentials undermine in practice the rhetorical commitment to more education; and the fact that employment in many middle-skilled occupations is unstable with low wages for entry-level positions undermines the incentives for individuals to get the years of training and experience that employers are calling for. Educational institutions that reform themselves to provide more basic skills or more up-to-date methods and equipment or a broader array of "foundation skills" or co-op programs—but which face employers without jobs to reward students—will quickly be forced to abandon these innovations.

The appropriate question, then, is what are the responsibilities of employers within the sub-baccalaureate labor market to reform their own practices? A number of specific tasks for employers have already emerged from the recommendations, including the following:

- Employers can participate in schools and colleges, helping to clarify to students the requirements of the work world and the consequences of poor education.
- Employers should participate on advisory committees with fuller and more accurate information and if possible with more accurate and timely forecasts of employment needs than is sometimes the case. In some regions, the information employers provided to us on the changes in production and the deficiencies of employees has not made its way to educational institutions, for example; so postsecondary occupational programs are not up-to-date.
- Co-op programs can work effectively only if they have the full cooperation of employers, particularly in providing co-op placements of high quality with decent prospects for future employment.
- The development of skill standards and other mechanisms for organizing sub-baccalaureate labor markets requires the participation of employers. Indeed, if skill standards do not have the backing of employers and are not used in hiring decisions, then they are virtually worthless because they will induce educational institutions to change (and upgrade requirements) without any effects on student success—a process likely to become evident to students and then to reduce enrollments.

  However, there are still other actions that employers take, having nothing to do with cooperation with educational institutions, that have the most profound influences on community colleges and technical institutes through the incentives students face. If firms fail to restructure these incentives, then all the exhortations to improve education and all the cooperation between providers and employers will come to nothing. If employers are to support rather than to undermine the efforts to enhance work-related capacities, the steps they should take include the following:

  - Hiring decisions should be more responsive to educational accomplishments. The current structure of hiring standards within the sub-baccalaureate labor market—in which additional education provides an unclear and uncertain advantage in most occupations, aside from those (like health occupations) which have been organized by skill standards and those (like electronics) where employers have begun to require associate degrees—provides few incentives for individuals to improve their skills. The reliance on experience may be rational from the viewpoint of employers, but it also encourages individuals to forego schooling in order to accumulate experience—generating a cohort of employees who lack the basic academic skills necessary for the current workplace. The only antidote is for employers to restore employment incentives for the relevant general capacities, including school-based credentials, since exhortation to individuals and educational institutions cannot accomplish much in the face of employer indifference.

- Wage structures should recognize skill differentials. The current situation—where many employers say they prefer a combination of experience and postsecondary schooling but reward only experience—is again one in which employment practices undermine employer rhetoric.

- Employers need to preserve and enhance internal career ladders as mechanisms of inducing individuals to acquire additional skills (including on-the-job training and formal retraining) and as incentives for entering occupations where relatively long training periods are required to develop the requisite capacities. In particular, the practice of relying on temporary workers is destructive in several ways: It shortens career ladders within firms; it reduces the incentives for individuals to enhance their skills since temporary workers cannot be upwardly mobile; it makes it increasingly difficult for individuals to gain entry into sub-baccalaureate labor markets; and it may reduce loyalty to individual firms and thereby make it more difficult for firms to retain the firm-specific human capital they create through on-the-job training. Of course, the expansion of temporary work is harmful to workers in some obvious ways since it undermines their job stability, employment rights, and prospects for advancement. But it is also harmful to the interests of employers over the long run by converting entry-level positions of the sub-baccalaureate labor market into unskilled positions contrary to the call from employers for enhanced capacities.

- Employers should reduce cyclical variation in employment as much as possible since frequent layoffs of sub-baccalaureate workers—of which electronics technicians and machinists are good examples—undermine the incentives to accumulate the required education.[115] At the very least, employers must recognize that "shortages" in some occupations are caused not by failures among educational institutions but by their employment policies, including low entry-level wages and unstable employment.

The issues of what employers should do to improve the functioning of the sub-baccalaureate labor market will take some time to work out since the obvious question—what are the responsibilities of employers?—has so rarely been addressed. Furthermore, there are currently few instruments of public policy that can force employers to change their employment practices so as to encourage rather than undermine educational reforms because—unlike our German and Japanese competitors whom we seek to emulate in so many other ways—the traditions of *laissez faire* and limited regulation of business have always been particularly strong in this country.[116]

Nonetheless, answering the question is inevitable. Markets operate through the interaction of demand and supply, and supply-side policies—in this case, reforms that place the entire burden for change on educational providers—cannot be successful without related changes on the demand side. Improving the operations of the sub-baccalaureate labor markets in the interests of employers and employees alike will therefore require the reform of both educational policies and employment practices.

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[115] For a more extended discussion of employment security, see Osterman and Kochan (1990).

[116] We note, however, that President-elect Bill Clinton has proposed a requirement that large firms spend at least 1.5% of their wage bill on training.

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Appendix A
INTERVIEW METHODS AND PROTOCOLS

In each local labor market, we interviewed providers of postsecondary education and training; employers; and a few general respondents, like staff members of private industry councils, city economic development agencies, and employer associations.

The providers of education and training included all local community colleges and technical institutes plus any other institutions mentioned by employers. For example, in Frankton, an area vocational school north of the city was included; in Cotooli, the vocational high schools were included because many employers have co-op programs with them; and in Palmdale, a well-known community-based organization was mentioned by several employers and therefore included in interviews. Otherwise, however, we limited our examination to postsecondary institutions and did not interview proprietary schools because they were so infrequently used by employers.

The interview protocol used for education providers specifies questions for deans, directors of placement, and other central administrators and somewhat different questions for department heads (e.g., the heads of the business and the computer science departments) who were presumed to be more knowledgeable about the education and the labor market for the six occupations we examined. We also interviewed faculty where department heads referred us to particularly knowledgeable individuals.

We chose employers to interview in several ways. We generally began with lists of local employers from the Chamber of Commerce and local offices of economic development and firms mentioned by the educators we interviewed—particularly those represented on advisory committees, those with cooperative agreements with educational institutions, and those mentioned as particularly important sources of hiring for the institution. We then selected firms likely to include significant numbers of the six occupations we examined—for example, accounting and insurance firms for accounting and manufacturers for machinists and electronics technicians. Within these firms, we concentrated our questions on the six occupations we selected for study, as the employer protocol clarifies. We tried to interview the individual in charge of hiring in these occupations; when this individual was not the supervisor, we attempted to interview the supervisor as well in order to get more precise information about skills required on the job and the performance of individuals with various backgrounds.

In Frankton, Rosefield, and Palmdale, all interviews took place in person, save for a few that took place over the telephone where it became too difficult to schedule personal interviews. In Cotooli, located too far from Berkeley for frequent trips, interviews with education providers were conducted by telephone. For employers, we initially held a focus group with eleven employers and subsequently conducted employer interviews in person during a concentrated week.

Our interviews were not always comprehensive—for example, in some educational institutions we were unable to interview each of the six department heads—and the employers interviews did not contact a random sample of employers because of our need to examine firms with concentrations of employees in our six occupational areas. Nonetheless, the numbers of interviews were substantial enough and corroborated one another sufficiently; therefore, we do not think that the nonrandomness of our interviews affected the result. There is one potential exception: We were unable to interview in many small firms because they are difficult to identify and hire too few individuals in any one area to provide much information about their hiring policies. Therefore, it is possible that our description of middle-skilled labor markets fails to distinguish the special characteristics of small firms.The following table presents the numbers of interviews we conducted in each of the four labor markets:

Table 1

Numbers of Interviews Conducted

	Frankton	Palmdale	Rosefield	Cotooli	Total
Education providers:					
Institutions	6	4	5	4	19
Individuals	20	15	27	14	75
Employers:					
Firms	31	20	27	35*	113
Individuals	46	28	36	43*	153
General respondents	4	3	2	2	11

* In addition, we interviewed eleven individuals from eleven firms in a focus group at the beginning of our stay in Cotooli.

Virtually all interviews were tape-recorded and transcribed; therefore, the quotes we have included in the text are direct quotes and not reconstructions. A very few interviews over the telephone could not be transcribed; these were, therefore, reconstructed from notes.

Interview Guide—Education Providers

DEAN

1. How does [school] plan which vocational courses or programs to offer?

   PROBE: Does it have a formal planning mechanism, an advisory board which provides information about occupational areas?

   YES NO

2. (If YES) What institutions are represented on this board?

3. Does this board make recommendations for changes in curriculum and degree or certificate programs?

   YES NO (If NO, go to Question 6)

4. (If YES) What recommendations have been made?

5. Have these recommendations been implemented in your school?

   YES NO

6. Has [school] worked with the private sector in the development of certificate or degree programs?

   YES NO (If NO, go to Question 9)

7. (If YES) What types of firms or groups are you working with?

8. What agreements have been reached in this group regarding curriculum and degree or certificate programs?

9. Have there been changes in students' enrollment in degree or certificate programs in the last five years?

   YES NO (If NO, go to Question 12)

10. (If YES) In which programs? Could you describe those changes?

11. To what do you attribute these changes?

12. Have any vocational programs been eliminated within the last five years?

    YES NO

13. (If YES) Why?

14. What trends have you noticed among students applying to vocational education programs? What percentage are entering for initial job training, upgrading, or retraining to learn a new occupation?

    PROBE: When did this trend begin? How do you account for these changes?

15. How does [school] define a completer and noncompleter in vocational education programs?

16. Does [school] offer customized training courses to meet the needs of particular firms?

    YES NO

17. (If YES) For which occupations and for which types of firms?

18. What is the length of customized training programs?

19. What percentage of [school]'s vocational education is customized training?

20. How is customized training funded? Does this differ for firms and/or occupations?

21. Does [school] receive any state-funded job training or economic development programs?

    YES NO

22. (If YES) For what occupations do these funded programs train students?

23. Do local employers or employer organizations influence the content of courses for job retraining?

    YES NO

24. (If YES) Could you describe their influence?

25. Do you have a sense of what jobs students are hired for when they graduate from [school]? The types of jobs they get? Whether they remain in the local area or relocate elsewhere? What types of industries or firms are most likely to employ them?

26. What are the emerging issues in the [area] labor market which face vocational education providers?

    PROBE: What will be the additional problems?

The second half of the interview will focus on specific occupational programs offered at [school]. The six occupations we are interested in are electronics technician, machining, drafting, accounting clerk, business management, and computer programming.

Which of these six does [school] offer? The questions I will ask will refer to each of these occupations.

27. How long has [school] offered a degree or certificate in [occupation]?

28. Why did [school] decide to offer a degree or certificate in [occupation]? Specify whether the school offers a degree, a certificate, or both in [occupation].

29. What changes in curriculum for [occupation] have been introduced recently?

30. What prompted these changes?

31. Does the school place large numbers of students in the [occupation] program with particular local employers?

    YES NO

32. (IF YES) Why are these firms considered good placements?

33. Do you have the name of a contact person within the firm(s)? How long have you been referring students to these firms and contacts?

34. What has been the trend in enrollments for [occupation]?

35. What do you think has contributed to this trend?

36. What are the differences between credit and noncredit courses for [occupation]? For which types of jobs are students from the two groups prepared?

37. How would you compare the skills students acquire in the [occupation] program here and the jobs they are hired for after leaving [school] with students in similar programs in other local programs, including proprietary schools?

DEPARTMENT CHAIRS

1. What has been the trend in enrollments (completions, dropouts) for [occupation]?

2. What do you think has contributed to this trend?

3. Does the school place large numbers of students in the [occupation] program with particular local employers?

   YES NO

4. (IF YES) Which types of firms do you tend to place students with? How would you characterize or assess these types of placements in terms of students' future employment histories?

5. Do you have the name of a contact person within the firm(s)? How long have you been referring students to these contact people and firms?

6. What percentage of students are not placed?

7. What are the reasons for the lack of placements for these students?

8. What trends have you noticed among students applying to vocational education programs? What percentage are entering for initial job training, upgrading, or retraining to learn a new occupation?

   PROBE: When did this trend begin? How do you account for these changes?

9. How does [school] plan which vocational courses or programs to offer?

   PROBE: Does it have a formal planning mechanism, an advisory board which provides information about occupational areas?

   YES NO

10. (If YES) What institutions are represented on this board?

11. Does this board make recommendations for changes in curriculum and degree or certificate programs?

    YES NO

12. (If YES) What recommendations have been made in the case of [occupation]?

13. Have these recommendations been implemented in your school?

YES NO

14. (If YES) How successful has it been?

PROBE: Has it improved/upgraded skill training or improved coordination of curriculum?

15. Has [school] worked with the private sector in the development of certificate or degree programs in [occupation]?

YES NO

16. (If YES) What group(s) are you working with?

17. Do local employers or employer organizations influence the content of courses for job retraining?

YES NO

18. (If YES) Could you describe their influence?

19. What agreements have been reached in this group regarding curriculum and degree or certificate programs?

20. Have there been changes in students' enrollment in degree or certificate programs in [occupation] in the last five years?

YES NO

21. (If YES) In which programs? Could you describe those changes?

22. To what do you attribute these changes?

23. Are there labor shortages or surpluses for [occupation] in this area?

24. Has the school changed its enrollment for [occupation] in response to labor market changes?

25. (If YES) What changes have been instituted?

(If NO) Why not?

26. Have any vocational programs been eliminated within the last five years?

YES NO

27. (If YES) Why?

28. Is there any chance the program in [occupation] might be eliminated?

29. What percentage of [school]'s vocational education is customized?

30. What are the skills students acquire in [class] which prepare them for work as [occupation]?

31. Have you changed the course content for [occupation] in response to requests from employers?

32. What are the differences between credit and noncredit courses for [occupation]?

33. How does the remainder of the curriculum prepare students for [occupation]?

34. Are there additional skills (or information) which students need for [occupation]?

35. How would you redesign the curriculum for students to learn these skills?

36. How would you compare the skills students acquire in the [occupation] program here and the jobs they are hired for after leaving [school] with students in similar programs in proprietary schools?

37. Do you have a sense of what jobs students are hired for when they graduate from school? The types of jobs they get? Whether they remain in the local area or relocate elsewhere? Whether the jobs are related to their training? What types of industries or firms are most likely to employ them?

Now I'd like to ask you a few broad questions which will give you an opportunity to address any additional issues regarding occupational training and employment.

38. What are the emerging issues in the [area] labor market which face vocational education providers?

39. How do you envision vocational education's responses to these problems?

40. What do you expect the most crucial employment and training issues will be for vocational education in the next five to ten years?

This concludes the interview. Do you have any additional comments which the questions did not cover but which you consider important for vocational education?

Interview Guide—Employers

1. What skills do you believe [applicant in occupation] should have prior to employment that would qualify her/him for the job?
    - basic math skills
    - basic communications skills (i.e., reading and writing)
    - advanced math (i.e., algebra and calculus) (specify math skills)
    - familiarity with basic technical knowledge of the field
      PROBE: Could you describe these skills?
    - some "hands-on" experience with the relevant technology/equipment (specify type of equipment)
    - other (specify)

2. Do applicants for [occupation] generally have these skills?

    YES NO

3. (If NO) Could you describe the skills or job preparation applicants lack?

4. How do you recruit for [occupation]?
    - newspaper ads
    - company recruiter in schools
    - guidance counselors in schools
    - word of mouth
    - current employees
    - JTPA
    - JOBS office
    - state employment office
    - other (specify)

5. What is the minimum education or training required for entry-level [occupation] to perform the job?
    - high school diploma
    - two-year degree
    - certificate
    - no degree, but must have taken relevant courses in the field (specify courses)
    - work experience

6. What other skills or qualifications do you look for in [occupation]?

7. Do you administer a pre-employment test for occupation? What kinds of skills are you testing for?

Probe for behavioral and occupational skills employer is interested in learning about with respect to prospective employees.

8. Do you find that your firm hires [occupation] from particular educational institutions and/or training programs?

   YES NO (If NO, go to Question 13)

9. (If YES) Please check as many of the types of institutions as apply and list the name of the school.
   - community colleges*
   - technical institutes*
   - vocational high school
   - proprietary schools*
   - other public/private education programs (specify)
   - JTPA
   - employment service/job service
   - other state/local training programs* (specify)
   - other government training/employment programs*

   * Specific state and local programs and educational institutions will be included for each of the labor markets in this study.

10. What percentage of [occupation] are hired from [each educational institution]? (Use the names of the schools' respondent cites in Question 9)

11. Why do you hire from these schools? (check as many responses as apply)
    - The school has a reputation for quality training.
    - The firm has hired workers from these schools and found them to be well-trained.
    - Some of the firm's supervisors or managers teach courses at the institution, so we know students are getting exposure to appropriate skills.
    - The firm is part of a consortium of employers/educational institutions. We have worked together to design curriculum and/or recommend courses and programs for job training.

      PROBE: How long has the firm been affiliated with this group? Which educational institutions does the recruiter work with?
    - The firm has a hiring agreement with one or more of the area's schools.

      PROBE: How long has this agreement been in effect?
    - The firm's recruiter has contacts with particular educational institutions in the area.

      PROBE: How long has the firm had such a position?
    - The firm receives government subsidies.
    - Other (specify).

12. What skills do applicants from these schools have that make them more likely to be hired by your firm?

    - solid basic skills curriculum
    - technical skills appropriate for entry-level jobs
    - broad knowledge of the field
    - training appropriate for advanced level work in [occupation]
    - other (specify)

13. Have you found any differences among workers who received training in various schools?

    YES NO

14. (If YES) Describe those differences.

15. In general, how well do local vocational education institutions prepare students for employment as [occupation]? Why?

16. What suggestions would you have for improving the training of [occupation]?

    - more technical courses (specify courses)
    - more advanced math courses
    - focus on general skills/broad-based knowledge
    - program deficient in several areas (specify)
    - preparation for the "world of work" (list the specific behaviors)
    - no changes, training is satisfactory

17. Are there labor shortages or surpluses of individuals qualified for [occupation]?

18. Do you have to recruit from outside of the local area to find qualified [occupation]?

    YES NO

19. Are there differentials in pay for individuals with different levels of education or experience? For example, are there differences in starting salaries for workers with experience but no degree and workers with certification, degrees, or coursework?

    YES NO (If NO, go to Question 21)

20. (If YES) Could you describe the company's policy regarding education-related salary differentials?

    - policy related to prior job experience salary differentials?
    - policy related to on-the-job (OJT) salary differentials?

21. Does the firm offer OJT for [occupation]?

YES NO (If NO, go to Question 28)

22. What percentage is formal ______ % informal ______ %

23. Who provides OJT? For each category checked, please specify the length of time workers in [occupation] spend in OJT.

_________ senior workers in the unit
_________ direct supervisor
_________ vendor
_________ other (specify)

24. Are basic skills included in the firm's OJT program?

YES NO (If NO, go to Question 25)

25. (If YES) Describe the basic skills which are part of the firm's OJT program.

26. How long have basic skills been a part of OJT?

27. Are job specific skills taught in OJT?

YES NO

28. (If YES) Could you describe these skills?

29. If your firm wanted to upgrade OJT, what skills should employees have acquired prior to employment that would improve the company's training program?

30. Describe your firm's policies on promotion for [occupation]. Please indicate what skills are needed for each job title.

PROBE: If answers are too general: What skills are [occupation] expected to acquire in order to qualify for promotion within the occupation?

31. Are workers tested as part of consideration for promotion?

YES NO (If NO, go to Question 33)

32. (If YES) Could you describe the kind of test [occupation] is given to qualify for a promotion?

33. What are the criteria for promotions within [occupation]?

Probe for specific company policy regarding promotions and the particular skills and requirements of the occupation.

34. For a nonunion [occupation]: What amount of seniority is considered appropriate when considering a [occupation] for promotion? Please indicate the time period for each title.

35. For a [occupation] represented by a union: What are the contractual rules covering promotions for [occupation]?

36. Does the firm receive support through the Targeted Jobs Tax Credit?

YES NO

37. Describe the kinds of equipment and technology [occupation] use.

38. How long has the company used this equipment?

- purchased in the last year
- purchased in the last five years

Now I'd like to ask you two broad questions which will give you an opportunity to address any additional issues regarding employment and training within your firm.

39. What are the biggest problems you have encountered in hiring [occupation]?

40. What do you expect the most crucial employment and training issues will be in the [area] in the next five to ten years?

This concludes this phase of our study. Do you have any additional comments about employment and training that we did not cover here but which you consider important for your firm?

Appendix B
DESCRIPTIONS OF LOCAL LABOR MARKETS

Frankton

Frankton, a city of 350,000 in an area of 650,000 residents, is located in the middle of a rich agricultural area and serves as the financial center for the region. The area's economy has historically depended upon agriculture, including the food processing industry, and many of the firms located in Frankton are food-related enterprises. Because Frankton's economy remains tied to agriculture, employment rates fluctuate seasonally. Nevertheless, there has been a gradual shift in employment toward the service economy. Of the ten largest employers, nine are either service or government related.

The Frankton area has been experiencing population growth through in-migration as well as increasing birth rates within the population. Frankton has one of the higher numbers of children per family in the state. There has also been a pattern of in-migration. According to economic development experts in Frankton, in-migration is occurring at both ends of the economic spectrum—with professionals who are leaving nearby large cities and with Asian refugees who were primarily agricultural peasants in their country of origin. In the last decade, Frankton's Asian population has gone from under one percent to just over ten percent of the population. As a result, there are now seventy-six different languages spoken in the Frankton school district. The district states that fifty percent of the students entering the school system are not native English speakers.

A state university campus and a community college are located in Frankton. The community college, with a Fall enrollment of about fifteen thousand, is known statewide to be active in customized training; in addition, the college supports a short-term job training center that provides noncredit courses of twenty to thirty weeks, largely for JTPA and GAIN (Greater Avenues for Independence) clients. Another community college located to the northeast also serves the Frankton labor market, and the school district located just north of the city operates an area vocational school, serving both adults and secondary school students, that is used by some employers.

Palmdale

The greater Palmdale area has been a center of high-tech manufacturing and service firms for the last fifteen to twenty years. The city itself includes about 800,000 people, with 1,500,000 people in the county. Over one-quarter of the workers in the county are employed by high-tech firms.

Although the county had a strong economy in the 1980s, in the 1990s there has been a decline in well-paid jobs for less educated workers. By 1990, professional, management and technical jobs supported slightly over forty percent of the population. In contrast, in 1960, less than one-quarter of the population was supported by these higher-level jobs. Manufacturing positions have been declining, as evidenced by the eighteen percent decline in operator and assembly jobs in the 1980s, causing less-educated and immigrant workers to move into service jobs or to leave the county. Blue-collar jobs are moving to other locations in the United States and to offshore locations. Past productivity gains in area firms have especially decreased the need for less-educated employees. Low-paying service positions along with white-collar positions are expected to increase in the future; whereas, college-educated workers fared the best in the 1980s.

As a result of the recession, the shrinking defense industry, and competition from U.S. and overseas firms, many electronics firms have moved some (or all) facilities to other states or are considering such a move. A recent report released by a group of high-tech companies identifies several barriers that inhibit growth in the area, including high housing costs, a congested transportation system, burdensome state regulations, and an inadequate educational system. Job growth has slowed down from a former average of thirteen percent annually to less than five percent. In the last year, one fifth of workers between eighteen and thirty attempted to find work in other areas. As our interviews show, employers do not feel that sufficient numbers of nonprofessional and blue-collar workers can be recruited into the county because of the high cost of housing. Even white-collar managers, who make up one-fourth of the unemployed, have been hit by hard times. As a result, the meaning of career opportunities has changed in the last decade. Job security and advancement no longer are promised, and employers expect employees to move to other companies or to other types of positions within companies. In order to retain and increase profits during the recession, employers have cut back on whom they will hire. Furthermore, temporary hires have become more prominent.

In 1990, the county in which Palmdale is located had the following employment distribution: Manufacturing accounted for about thirty-four percent of employment; services for twenty-six percent; retail trade for thirteen percent; government for ten percent; wholesale trade for six percent; mining and construction for four percent; financial, insurance, and real estate for three percent; and transportation and public utilities for three percent.

Unemployment rates in the region were high last year compared to previous levels. The unemployment rate in the county was at 5.6% in May 1991 but decreased to 5.0% in November and December. Higher rates emerged during the winter; and the spring months of March, April, and May of 1992 registered unemployment rates of about 6.5%, which is over two percentage points lower than the state level.

Almost one-quarter of county residents are born in countries other than the United States and about seven percent of county residents are limited in their English speaking skills. In the City of Palmdale, non-Latino whites make up fifty-five percent of the population, Latinos make up twenty-five percent, Asians and others account for sixteen percent, and African Americans account for four percent. As a result, almost all Palmdale-area employers mentioned the need for ESL training.

The vocational education providers in the greater Palmdale area include a community college within the city itself and a sister college located just south of the city, two well-known community colleges located in middle-class communities north of the city, two other community colleges located nearby, and an area vocational school operated by the school district. We interviewed individuals in one college from each pair of sister schools, as well as a community-based organization well-known for its vocational programs.

Rosefield

The city of Rosefield, with a population of approximately 375,000, is one of the fastest-growing communities in the state, having expanded in population by over fifteen percent from 1980 to 1990. The city has traditionally functioned as the employment, trade, financial, and service center for the four-county metropolitan area, with a population of about 1,500,000. The area is an important highway, rail, and river hub and a marketing center for the area's agricultural region. Nearby military installations and the space and aviation industries also contribute to Rosefield's economy.

While employment in government historically formed the core of its economy, the City of Rosefield and the greater metropolitan area have shown steady growth in private sector employment in recent years. Employment increases have been especially strong in retail trade; distribution; business services; and finance, insurance, and real estate throughout urban and suburban Rosefield County. Manufacturing growth, particularly for electronics firms, has been strong in the suburban areas of the metropolitan area since the mid-1980s.

Currently, federal, regional, state, county, and local government combined to make government the largest employer in the four-county area (approximately 30% of the labor force). Although Rosefield County had a low unemployment rate in the 1980s, the rate has increased as a result of the recession and government cuts such as military closures. Certainly this sector remains a major part of the economic base, but as it continues to reduce its regional workforce, Rosefield's other sectors have gained a greater share of the labor force.

While growth in services slowed under recessionary conditions in 1991, it has increased its labor share in the Rosefield area eight percent in the past year. Continuing gains in service industries have resulted in this sector becoming the area's second largest sector (24.2% of the 1991 labor force). According to the 1992 report from the city's Employment Development Department, this sector is expected to produce one of every three new jobs through 1993.

Retail trade in Rosefield's metropolitan area is still one of the fastest growing segments of the economy, although it also has experienced some decline as a result of the recession. This sector of the economy provided nearly twenty percent of the jobs in 1991. In contrast, manufacturing accounted for only 6.5% of the labor force in the Rosefield metropolitan area, compared with 7.2% in 1991. The growth of this sector is very erratic because of alternate periods of growth and consolidation in electronics and aerospace.

During the 1960s the area's aerospace industry employed large numbers of manufacturing personnel from the city and outlying areas. Subsequent declines in that industry created massive job losses from which the area's manufacturing sector has not yet recovered. The city has also seen a decline in food processing, which also once played a large role in the area's manufacturing base. However, slower employment growth in food processing and other nondurable goods over recent years has been offset by faster growth in durable goods. This category is considered to be important to the area because it lends diversification to the economy in the area of technology-based manufacture, including electrical equipment, measurement and control instruments, and transportation equipment.

The Rosefield area established a regional community college district in 1965, bringing together under one governing board three community colleges. The Rosefield area also has one major state university.

Cotooli

The Cotooli area, located in the industrial Midwest, includes the city proper, three adjacent counties, and several counties in the states directly south and west of the city. The labor market has a history as a machine tool manufacturer and other diverse manufacturing industries. During the recession in the 1970s, Cotooli, like other Northeast and Midwest cities, lost many of its manufacturing jobs: According to a study by the local university, the city has had a 14.5% decline in manufacturing employment since 1970.

In spite of these losses, Cotooli's economy has had a slight recovery over the last decade. According to the 1990 census, the unemployment rate in the Cotooli area is 5.0% although the city proper has a higher rate of 7.9%. There are several reasons for the area's lower unemployment rate. First, relative to other Midwest cities, Cotooli's economy was never dominated by one industry such as auto or steel. The machine tool industry, which suffered a serious decline during the 1970s, has—through mergers, downsizing, and reorganization—stabilized in recent years. Second, since the mid-1980s there have been aggressive efforts by state agencies to attract businesses to the county's outlying districts. Many of these firms, recruited from overseas, are highly automated factories in both process and product. Some of these plants are state-of-the-art machine tool producers taking advantage of the area's reputation as a machine tool manufacturing site. In addition to its small manufacturing base, the area north of Cotooli has historically been predominantly agricultural. While the culture of the area remains by and large rural, the role of agriculture in the economy is rapidly diminishing, being replaced by suburban housing and goods distribution associated with the nearby airport. The city located south of Cotooli has been redeveloped as a hotel, convention, and tourist center, increasing the demand for service workers in the area.

Cotooli's relative economic strength is based on several factors: a diverse manufacturing base, which includes the recruitment of foreign manufacturers locating facilities in the area; the development of its service economy, including the building of convention and hotel facilities and related service industries; the relocation of corporate headquarters to the area; and the expansion of the transportation industry which has attracted distribution centers and some white collar and technical jobs. Cotooli's economy is approximately twenty percent manufacturing; six percent transportation and public utilities; twenty-five percent wholesale and retail trade; six percent financial, insurance, and real estate; five percent construction; twenty-five percent services; and thirteen percent government employment.

The populations of the City of Cotooli and county in which it is located have declined over the last twenty years from 450,000 to 360,000 and 925,000 to 865,000, respectively. However the population in the greater Cotooli area increased by 130,710 between 1970 and 1990. The increase is a result mainly of the growth in the outlying counties both north and south of the city. According to the 1990 census, the median income in 1989 for the area was $29,500, higher than for the state as a whole (which was $28,706).

The University of Cotooli has three colleges which provide two-year associate degrees. A key component of the postsecondary education system is the co-op program which began in the early 1900s at the University of Cotooli as a means of integrating engineers into corporate culture as they received technical training. After World War II, the co-op system was extended into the postsecondary vocational institutions. The program combines classroom training with work experience as a requirement for the successful completion of the degree. Students are placed with employers who are expected to provide them with employment related to their area of study. This arrangement is designed to give students the opportunity to combine theory and practice and enrich the educational process.

Some students are hired as permanent employers by these firms upon receiving their degrees.

In addition to the University of Cotooli's community colleges, area employers also recruit from community colleges north of the city and from the neighboring state.

In addition, the local high school district maintains four area vocational schools around Cotooli, which students attend full-time for two or three years, with half their time allotted to vocational courses. Since many employers have established co-op programs with these area vocational schools, we interviewed administrators associated with these institutions.